

LIST OF MATERIALS

Acceptable for Use on Systems of RUS Electrification Borrowers

**United States Department of Agriculture
Rural Utilities Service**

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DISCLAIMER

*Every effort has been made to ensure the accuracy of this document.
However, in case of discrepancies, records of Technical Standards
Committee "A" are the authoritative source.*

PREFACE

This list supersedes all preceding issues including revisions. Revised sheets reflecting changes in the list will be issued quarterly and should be inserted in order to keep your copy up to date.

The items shown in this publication include material and equipment for transmission and distribution facilities. Items not listed include office equipment, tools and work equipment, items of electric general plant and consumer owned wiring facilities. The listings apply only to new items of material and equipment and not to used items.

In addition to items accepted on a general basis, this list also includes items accepted on a conditional basis. As one of the conditions in the acceptance of an item on a conditional basis, contractors are required to obtain the borrower's concurrence prior to its use.

The inclusion of an item in this list does not indicate that item's manufacturer or its principals have not been debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded pursuant to Executive Order 12549, Debarment or Suspension, or any rules or regulations issued thereunder, including 7 CFR Part 3017 ("Debarment Regulations"). Therefore, borrowers must comply with the requirements imposed by the Debarment Regulations before entering into any "covered transaction", as defined by 7 CFR Part 3017, involving any item on this list.

The acceptance of an additional item or the deletion of an existing item is a function of the Technical Standards Committees. Any manufacturer desiring to have a new item placed on the list, or any user believing an existing item should be removed from the list, is invited to submit the matter to the Committees. Any communication calling attention to an error or omission in the list, such as a wrong catalog number, an obsolete item, etc., will be appreciated. All communications should be addressed to Technical Standards Committee "A" (Electric), Rural Utilities Service, Stop 1569, U. S. Department of Agriculture, Washington, D. C. 20250-1569.

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-S-

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a - Insulator, pin type

ANSI Class	55-2	55-3	55-4
Application	5 kV	12.5/7.2 kV and 13.2/7.62 kV systems	12.5/7.2 kV and 13.2/7.62 kV systems (where greater insulation is needed)
Pinhole diameter	1 in.	1 in.	1 in.
Porcelain Products (Knox) ²	253	261-S	366-S
Victor Insulators, Inc.	8	5	6
ANSI Class	56-1	56-3	56-4
Application	24.9/14.4 kV distribution lines	33 - 34.5 kV transmission lines	44 - 46 kV transmission lines
Pinhole diameter	1-3/8 in. Metal thimble (unless noted)	1-3/8 in. Metal thimble	1-3/8 in. Metal thimble
Porcelain Products (Knox) ²	1027-S	2045-S	-
Victor Insulators, Inc.	27-R ¹	245-R	255-R

¹Does not have a metal thimble.

²ANSI class 55-2, 55-3, 55-4, and 56-1 pin insulators manufactured at both the Knoxville and Macomb plants are acceptable.

Conditional List
a(1)
July 2002

a - Insulators, pin type

Manufacturer	Conditions
*Porcelain Products 1027-ST, 24.9/14.4 kV, ANSI Class 56-1	To obtain experience.

*Does not have metal thimble.

b - Pin, pole top, steel

DISTRIBUTION

	12.5/7.2 or 13.2/7.62 kV	24.9/14.4 kV
Pin length, inches:	20	20
Thread diameter, inches:	1	1-3/8
Hole spacing, inches:	8	8
RUS Specification:	D-3	DT-3
Dixie	D-2172-R	D2195-R
Hubbell (Chance)	2199	2195
Joslyn	J740	J720
Kortick	-	K8086
MacLean (Continental)	U36606F-REA	U36652

Pins listed below have 4-1/2" offset which eliminates the use of Item cs

Hubbell (Chance)	C206-0271
Joslyn	J25179
MacLean (Continental)	U36549

TRANSMISSION

Pin Length, inches:	24
Thread diameter, inches:	1-3/8
Hole spacing, inches:	8
RUS Specification:	DT-3
Hubbell (Chance)	2196
Kortick	K8087
MacLean (Continental)	U36653F

NOTE

1. Flared type pins may be mounted with either side against the pole.

Conditional List
b(1)
January 2003

b - Pin, pole-top
(Non-lead threads)

Manufacturer	Conditions
Hubbell Power Systems 2199P (1" threads)	To obtain experience.
Hughes Brothers 2770-A20-100 (1" threads) 2770-A20-130 (1-3/8" threads)	To obtain experience.
Joslyn J740Z (1" threads) J720Z (1-3/8" threads)	To obtain experience.

b - Pin, Fiber-reinforced plastic pole top

Manufacturer	Conditions
Joslyn 7581-624NT (1" threads)* 7581-624XNT (1-3/8" threads)* * Add suffix LT (less tabs) if for steel pole.	To obtain experience.

c - Bolt, machine

Applicable Specification: ANSI C135.1, "Standards for Galvanized Steel Bolts and Nuts" except that the lengths are in the ranges given below.

Applicable Sizes: 1/2 inch diameter, 6 through 10 inch length
 5/8 inch diameter, 6 through 24 inch length
 3/4 inch diameter, 6 through 26 inch length
 7/8 inch diameter, 6 through 28 inch length

The following manufacturers have shown compliance with the applicable specifications for machine bolts:

Dixie Electrical Manufacturing Company
Hubbell (Chance)
Hughes Brothers
* Joslyn Manufacturing Company
Kortick Manufacturing Company
MacLean (Continental)
* Portland Bolt & Manufacturing Company
The Rockford Bolt & Steel Company
Steel City Bolt & Screw Co., Inc.

*"Static proof" design available.

d - Washers, Flat

Flat Rolled Steel

Size, inches:	2-1/4 x 2-1/4	3 x 3	4 x 4	4 x 4	1-3/8 round	1-3/4 round
Thickness, in.:	3/16	1/4	3/16	1/2	12 gauge	10 gauge
Hole Diam., in.:	13/16	13/16	13/16	13/16	9/16	11/16
C & C Spacer	4	-	-	-	-	-
Dixie	D6814	D6817	D6818	D6819-1/2	D6803	-
FWC	FW1076	-	FW1080	-	FW1086	FW1088
Hubbell (Chance)	6814	6817	6818	6819-1/2	6803	6805
Hughes	SW2-1/4-70-3/16	SW3-70	SW4-70	SW4-70(1/2)	RW1-3/8-50	-
Joslyn	J1076	J1079	J1080	-	J1086	J1088
Kortick	K1553	K1555	K1557	K1559-1/2	K1524	K1525
Line Hardware	SWF-225B	SWF-300B	SWF-400A	-	-	-
MacLean (Continental)	U5485	U5487A	U5488	U5490A	U5478	U5479
Wrought Washer	011206	-	-	-	-	-

Flat Cast

Size, inches:	3 x 3
Thickness, in.:	1/4
Hole Diam., in.:	13/16
Hubbell (Chance) (N)	BB214
Joslyn (Flagg) (N)	P56A

Spurred - 3" Round, 3/16" Thick, 13/16" Hole

MacLean (Continental)	TCSF-30-6
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(A) Aluminum Alloy
(M) Malleable Iron
(N) Nodular Iron

Washers, Curved

Curved Cast

Size, inches:	2-1/4 x 2-1/4	3 x 3	3 x 4	4 x 4
Thickness, in.:	1/4	5/16	7/16	1/2
Hole Diam., in.:	11/16	11/16	15/16	13/16
Hubbell (Chance) (N)	GCW1A	GCW31	CRW4A	GCW41
Joslyn (Flagg) (M)	P141	P143	P120	P144
Line Hardware (M)	-	CW 33-5	CW 34-7	CW 44-6
MacLean (Bethea)	-	WC-33-5	WC-34-7	WC-44-6
MacLean (Continental)	-	CW-33-5	CW-34-7	CW-44-6
Universal Electric (A)	UW-225	UW-335	UW-347	UW-446

(A) Aluminum Alloy
(M) Malleable Iron
(N) Nodular Iron

Curved Rolled Steel

Sizes, inches:	3 x 3	4 x 4(1)
Thickness, in.:	5/16	1/4
Hole Diam., in.:	11/16	15/16
Joslyn (Steel)	-	J6829

(1) To be used only on transmission systems.

f - Pin, crossarm
(With square washer, nut and MF locknut)

DISTRIBUTION

Thread (inches diam.)	1	1-3/8	1	1-3/8
Length above base (in.)	5	7	5	7
Length below base (in.)	5-3/4	7	1-1/2	1-3/4
Shank (inches diam.)	5/8	5/8	5/8	3/4

	<u>Long Shank</u>		<u>Short Shank</u>	
Dixie	D881	-	-	-
Hubbell (Chance)	881	4717	886	-
Joslyn	J203	J647	J221	J630
Kortick	K7104	K7611	K7122	K7631
MacLean (Continental)	U558	U3137A	U579	U3142

Clamp Type Pin

Thread (inches diam.)	1	1-3/8
Length above base (in.)	5-3/4	7
Dixie	D3322	D3324
Hubbell (Chance)	14322	14322-1
Joslyn	J3322	J3324

Washer Plate for Clamp Type Pin

These plates are equipped with lugs to prevent slippage of pin along crossarm. They may be used to replace the bottom plate on pins already installed.

Hubbell (Chance)	450091
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*"Static proof" designs available.

f - Pin, crossarm
(With square washer, nut and locknut)

TRANSMISSION

Thread (inches diameter)	1-3/8	1-3/8
Length above base (inches)	10	10
Length below base (inches)	7	1-3/4
Shank (inches diameter)	3/4	3/4
	<u>Long Shank</u>	<u>Short Shank</u>
Hubbell (Chance)	4332	-
Joslyn	J610	J633
Kortick	K7643	K7635
MacLean (Continental)	U3140	U3145

Conditional List

f(1)

July 2002

f - Pin, crossarm
(Non-lead threads)
(With square washer, nut and MF locknut)

Manufacturer	Conditions
<u>Hubbell</u> 881P - 1" thread, 5 3/4" shank 886P - 1" thread, 1 1/2" shank	To obtain experience
<u>Hughes Brothers</u> 2775-A5-3/4, 1" thread, 5-3/4" shank	To obtain experience.
<u>Joslyn</u> J203Z, 1" thread, 5-3/4" shank J221Z, 1" thread, 1-1/2" shank J647Z, 1-3/8" thread, 7" shank J630Z, 1-3/8" thread, 1-3/4" shank	To obtain experience.

g - Crossarms, fiberglass

<u>Manufacturer</u>	<u>Description</u>	<u>Conditions</u>
<u>Geotek (PUP)</u>		
<u>Braced Application</u>		
T2000-96-03X	8' Type-3 Drill Pattern	To obtain experience
T2000-96-04X	8' Type-4 Drill Pattern	
T2000-120-05X	10' Type-5 Drill Pattern	
T3000-96-03X	8' Type-3 Drill Pattern	
T3000-96-04X	8' Type-4 Drill Pattern	
T3000-120-05X	10' Type-5 Drill Pattern	
(X = color code)		
<u>Braceless (Centermount) Application</u>		
TB2000-96-03X	8' Type-3 Drill Pattern	To obtain experience
TB2000-96-04X	8' Type-4 Drill Pattern	
TB2000-120-05X	10' Type-5 Drill Pattern	
TB3000-96-03X	8' Type-3 Drill Pattern	
TB3000-96-04X	8' Type-4 Drill Pattern	
TB3000-120-05X	10' Type-5 Drill Pattern	
(X = color code)		
<u>MacLean Power Systems</u>		
<u>Braced Application</u>		
PX08REA003	8' Type-3 Drill Pattern	To obtain experience
PX08REA004	8' Type-4 Drill Pattern	
PX10REA005	10' Type-5 Drill Pattern	
<u>Braceless (Centermount) Application</u>		
PX08ST003	8' Type-3 Drill Pattern	To obtain experience
PX08ST004	8' Type-4 Drill Pattern	
PX10ST005	10' Type-5 Drill Pattern	
<u>Shakespeare</u>		
LSC-REA-03-(X)**	8' Type-3 Drill Pattern	To obtain experience
LSC-REA-04-(X)**	8' Type-4 Drill Pattern	
LSC-REA-05-(X)**	10' Type-5 Drill Pattern	
(**X=2-gray color or 5-dark bronze color)		

h - Brace, crossarm, steel

Wherever item "h" is shown on a construction drawing, use a brace from page cu.

i - Bolt, carriage

Applicable Specification: ANSI C135.1, "Standard for Galvanized Steel Bolts and Nuts."

Applicable Sizes: 3/8 inch diameter, 3 through 6 inch length
 1/2 inch diameter, 3 through 6 inch length

The following manufacturers have shown compliance with the applicable specifications for carriage bolts.

Dixie Electrical Manufacturing Company
Hubbell (Chance)
Hughes Brothers
Joslyn Manufacturing Company
Kortick Manufacturing Company
MacLean (Continental)
The Rockford Bolt & Steel Company

j - Screw, lag

Applicable Specifications: ANSI C135.3 "Standard for Zinc Coated Ferrous Lag Screws"

Applicable Sizes:

- 1/2 inch diameter, 4 inch length
- 1/2 inch diameter, 5 inch length
- 5/8 inch diameter, 4 inch length
- 5/8 inch diameter, 5 inch length

The following manufacturers have shown compliance with the applicable specifications for lag screws:

Dixie Electrical Manufacturing Company
Hubbell (Chance)
Joslyn Manufacturing Company
Kortick Manufacturing Company
MacLean (Continental)

k - Insulators, suspension

ANSI Class Type	52-9A Clevis	52-1 Clevis	52-4 Clevis	52-3 Ball & Socket
Disc Diameter	4-1/4"	6"	9" or 9-1/2"	9" or 9-1/2"
M & E Rating, lbs.	10,000	10000	15,000	15,000
Leakage	6-3/4"	7"	11-1/2"	11-1/2"
Flashover, kV: Dry	60	60	80	80
Flashover, kV: Wet	30	30	50	50
NOTES	(3) (4)	(3) (4)	(5)	(2)

Manufacturer	Catalog Number			
Lapp	-	-	9100	9000
Locke	16044	16583	15S410	15S409
Porcelain Prod. (Knox)	84300	86012	-	-
Sediver	CT-4R2-M	-	-	-
Victor Insulators, Inc.	817	804	-	-

ANSI Class Type	52-3 Ball & Socket	52-4 Clevis	52-5 Ball & Socket	52-6 Clevis
Disc Diameter	10"	10"	10"	10"
M & E Rating, lbs.	15,000	15,000	25,000	25,000
Leakage	11-1/2"	11-1/2"	11"	11"
Flashover, kV: Dry	80	80	80	80
Flashover, kV: Wet	50	50	50	50
NOTES	(2)	(1)	(2)	-

Manufacturer	Catalog Number			
GEC Alsthom	-	105452	-	-
Lapp	8200	8100	301425	2300
Locke	-	20S580	-	30S257
Porcelain Prod. (Knox)	81022	81012	-	-
Sediver	-	CT-8R2	-	-

Notes:

- (1) Use two for 24.9/14.4 kV deadends.
- (2) To be used only on transmission lines.
- (3) To be used only on distribution lines.
- (4) Use two insulators for 12.5/7.2 kV deadends and three for 24.9/14.4 kV deadends.
- (5) Use two insulators for 24.9/14.4 kV deadends.

k - Insulator, suspension

Manufacturer	Conditions
<u>Sediver</u> 10" suspension insulator N-8R2 (ball & socket, 20,000 lbs.) CT-14R2 (clevis, 30,000 lbs.) N-14R2 (ball & socket, 30,000 lbs.)	To obtain experience.

k - Insulator, polymer distribution deadend

Manufacturer	Conditions
<u>Dulmison</u>	
Distribution deadend	1. To obtain experience.
H-15 kV-4	2. For use as deadends on distribution lines only.
H-25 kV-6	3. Not recommended for use in areas subject to contamination.
<u>GLP</u>	
DS-15 (15 kV)	1. Same as (1) above.
DS-28 (25 kV)	2. Same as (2) above.
	3. Same as (3) above.
<u>Hubbell (Ohio Brass)</u>	
"Veri*Lite"	1. Same as (1) above.
Type PDI-15 (15 kV)	2. Same as (2) above.
Type PDI-25 (25 kV)	3. Same as (3) above.
Type PDI-35 (35 kV)	
<u>K-Line</u>	
Distribution deadend	1. Same as (1) above.
KL-15ASCTM (15 kV line-to-line)	2. Same as (2) above.
KL-28ASCTM (25 kV line-to-line)	3. Same as (3) above.
KL-46CTN (35 kV line-to-line)	
<u>MacLean (Reliable)</u>	
DS-15G (15 kV)	1. Same as (1) above.
DS-15M (15 kV) (metal end fittings)	2. Same as (2) above.
DS-25G (25 kV)	3. Same as (3) above.
DS-28M (25 kV) (metal end fittings)	
DS-35G (35 kV)	
DS-35M (35 kV) (metal end fittings)	
<u>Porcelain Products</u>	
Distribution deadend	1. Same as (1) above.
PDEI-15, 15 kV	2. Same as (2) above.
PDEI-25, 25 kV	3. Same as (3) above.

NOTE: When insulators from this page are used, adjust construction drawing material list quantities as necessary. Recommended maximum working load is 5,000 lbs.

k - Insulator, polymer distribution deadend

Manufacturer	Conditions
<u>Salisbury</u>	
Distribution deadend	1. To obtain experience.
9501 Series, 15 kV	2. For use as deadends on distribution lines only.
9502 Series, 25 kV	3. Not recommended for use in areas subject to contamination.
9501U-SI (silicone - 15 kV)	
9502U-SI (silicone - 28 kV)	
9503U-SI (silicone - 35 kV)	
9502L-EP (EPDM - 28 kV)	
<u>Sediver</u>	
Distribution deadend	1. Same as (1) above.
ODI-11-70-15 (15 kV)	2. Same as (2) above.
ODI-15-70-28 (25 kV)	3. Same as (3) above.
ODI-17-70-35 (35 kV)	
<u>Victor Insulators, Inc.</u>	
Distribution deadend	1. Same as (1) above.
8015 (15kV)	2. Same as (2) above.
8025 (25kV)	3. Same as (3) above.
8035 (35kV)	
8215 (15kV)	
8225 (25kV)	
8235 (35kV)	
<u>Volttek</u>	
Distribution deadend	1. Same as (1) above.
1515-00 (15 kV)	2. Same as (2) above.
	3. Same as (3) above.

NOTE: When insulators from this page are used, adjust construction drawing material list quantities as necessary. Recommended maximum working load is 5000 lbs.

I - Clamp, deadend

DISTRIBUTION

<u>Copper 2 through 6</u> <u>CWC 4A through 8A</u>		ACSR (Aluminum Clamps)			
		<u>4/0 & 3/0</u>	<u>2/0</u>	<u>1/0</u>	<u>2&4</u>
-	Alcoa	302	302	302	302
80500-2000	Hubbell (Anderson)	PG-57N	PG46N	PG-46N	PG-46N
-	C & R	CR-20-90	CR-10-90	CR-10-90	CR-10-90
-	Lapp	306120N	306118N	306118N	306118N
-	MacLean (Bethea)	DA-20N	DA-15-N	DA-15-N	DA-15-N

I - Deadend for steel strand (overhead ground wire)

TRANSMISSION

For high strength, extra high strength steel strand and aluminum clad steel strand

<u>Manufacturer</u>	<u>High Strength Steel</u>		<u>Aluminum-clad steel</u>				<u>Extra High Strength</u>	
	<u>3/8"</u>	<u>7/16"</u>	<u>7 No. 9 AWG</u>	<u>7 No. 8 AWG</u>	<u>7 No. 7 AWG</u>	<u>5/16"</u>	<u>3/8"</u>	<u>7/16"</u>
Alcoa Burdny Hubbell (Fargo)	4620.12	4627.14						
	YTW375E	YTW438E	YTW7M9T	YTW7M8T	YTW7M7T			
	861255	861430	861225	861227	861430	861022	861225	861430
<u>Formed Type*</u>								
Helical Line Prod. Hubbell (Chance)	HG210-3/8	HG211-7/16	HG523-12.5M	HG525-16M 16M-AWTLG	HG528-20M 20M-AWTLG	HG209-5/16	HG210-3/8	HG211-7/16

* Class B galvanizing. When overhead ground wire has Class C galvanizing, formed deadend should also have Class C galvanizing.

<u>Automatic Type</u>		<u>Clamp Type</u>	
Hubbell (Fargo)	GDE-302	GDE-303	GDE-303
MacLean (Reliable)	5202	5203	5202
			5201
			GDE-301
			5203
			GDE-302
			5202
			GDE-303
			5203

MacLean (Continental)	FQD-55-3LW	FQD-55-3-LW
Hubbell (Anderson)	SWDE-55N	SWDE-55N
MacLean (Bethea)	FD-550-N	

I - Clamp, deadend

DISTRIBUTION

2-Bolt Straight Line, Aluminum Alloy*

Manufacturer	Conditions
<u>Burndy</u> Aluminum alloy deadend Catalog No. CUW26RE-1 (#2-2/0 Str. Aluminum, #4-2/0 ACSR)	1. To obtain experience. 2. Applications limited to replacements under hot line conditions.
<u>C & R Products</u> Catalog No. CRDE-10-180 (#4 - 2/0 ACSR) Catalog No. CRDE-20-180 (3/0 - 4/0 ACSR)	Same as above.
<u>Hubbell (Anderson)</u> Aluminum alloy deadend Catalog No. ADSO-88(#2-1/0 ACSR) Catalog No. ADS-48-N (2/0 ACSR) Catalog No. ADS-60-N (3/0 ACSR)	Same as above.
<u>Hubbell (Chance)</u> Aluminum alloy deadend Catalog No. SDF10A (4 through 4/0 ACSR)	Same as above.
<u>Hubbell (Fargo)</u> Aluminum alloy deadend Catalog No. GD-961A side opening keeper (No. 4 and No. 2 ACSR) Catalog No. GD-972A (2/0, 3/0, 4/0 ACSR)	Same as above.
<u>MacLean (Bethea)</u> Aluminum alloy deadend Catalog No. ASO-684-2 (1/0, 2/0, 3/0 ACSR) Catalog No. ASD-2-N (4-2/0 ACSR) Catalog No. ASD-34-N 3/0, 4/0 ACSR Catalog No. HD 50-57 (with side opening) (4-4/0 ACSR)	Same as above.

*Straight line deadend clamps are applicable for urban construction where tensions are moderate and on lines often worked hot.

I - Clamp, deadend

DISTRIBUTION

(wedge type)

Manufacturer	Conditions
<u>Hubbell (Fargo)</u>	
Catalog No. GDW-010 (#4 - 1/0 ACSR)	To obtain experience.
Catalog No. GDW-040 (2/0 - 4/0 ACSR)	
Catalog No. GDW-556 (266.8 - 477 kcmil ACSR)	

m - Clamp, suspension

2 BOLT - DISTRIBUTION

	Copper & CWC	ACSR with Straight or Formed Armor Rods			
		4	2	1/0 & 2/0	3/0 & 4/0
ABB	6240	6241	6242	6243	6244
Alcoa	-	-	-	-	HSU*
C & R Products	-	-	-	CRSC-1	CRSC-2
Dulmison	-	-	-	-	HSU*
Hubbell (Anderson)	MS-46-N	MS-60-N	MS-70-N	HAS-85-N	HAS-104-N
Hubbell (Chance)	FWG1	FWG2	FWG3	FWG4	-
Lapp	305740N	306027N	306028N	306029N	306030N
MacLean (Bethea)	FS-46-N	GW-1-N	LS-0-N	LS-1-N	LS-2-N
MacLean (Continental)	FSC-46-N	FSC-60-N	SC-70-N	SC-85-N	SC-105-N
Preformed Line Products	-	-	-	-	AGS*

*Accepted for larger sizes.

m - Clamp, Suspension

ANGLE - DISTRIBUTION
No. 2 & 4 ACSR
Plus Rods

2300
AAC-301 & 302
-
GD-907A
306092
AC-60
RALS-1

ABB
MacLean (Continental)
Hubbell (Anderson)
Hubbell (Chance)
Hubbell (Fargo)
Lapp
Line Hardware
MacLean (Bethea)

2-BOLT TRANSMISSION
For 3/8" Steel Overhead
Ground Wire

6240
FSC-46N
MS-46-N
FGW1
-
305740N
-

n - Bolt, double arming

Applicable Specification: ANSI C135.1, "Standard for Galvanized Steel Bolts and Nuts."

Applicable Sizes: 5/8 inch diameter, 12 inch through 24 inch length

3/4 inch diameter, 20 inch through 24 inch length

The following manufacturers have shown compliance with the applicable specifications for double arming bolts:

Dixie Electrical Manufacturing Company
Hubbell (Chance)
Hughes Brothers
* Joslyn Manufacturing Company
Kortick Manufacturing Company
MacLean (Continental)
Portland Bolt & Manufacturing Company
Steel City Bolt & Screw Co., Inc.

*"Static proof" designs available.

o - Bolt, eye, oval

Applicable Specification: ANSI C135.4, "Standards for Galvanized Ferrous Eye Bolts and Nuts for Overhead Line Construction."

Applicable Sizes: 5/8 inch diameter, 6 through 20 inch length

3/4 inch diameter, 8 through 20 inch length

The following manufacturers have shown compliance with the applicable specifications for oval eye bolts:

Berny's Forging Company
Dixie Electrical Manufacturing Company
Hubbell (Chance)
* Joslyn Manufacturing Company
Kortick Manufacturing Company
MacLean (Continental)

*"Static proof" designs available.

Shoulder Eye Bolt
for Transmission Structures

3/4 inch diameter, 8 inch through 20 inch length

	<u>Catalog Number</u>
Joslyn	J9528 to J9540
Kortick	K9558 to K2570

p - Connectors, distribution (Parallel Groove)

Applicable Specification: ANSI C119.4

ACSR to ACSR
To same size or smaller

Bare Conductor

	<u>4/0 - 2/0</u>	<u>1/0</u>	<u>2</u>	<u>4</u>
Alcoa	-	396.6	490.0	490.0
Blackburn	PAE 4141-9	PAE 2121-9	PAE 2121-9	PAE 2121-9
Burndy	KVS28A	UCG25R	UC25R2R	UC25R2R
Connector Mfg.	APC-2/0	APC-2/0	APC-1/0	APC-1/0
Hubbell (Fargo)	GA-9040L	GA-9020L	GA-9002L	GA-9003L
Hubbell (Anderson)	LC-53A	LC-51C	LC-51A	LC-51A
Penn-Union	PCAA-20BF	PCAA-15BF	PCAA-10BF	PCAA-10BF
MacLean (Reliable)	APG-3	APG-2	APG-1	APG-1

Over Armor Rods

	<u>3/0</u>	<u>2/0</u>	<u>1/0</u>	<u>2</u>	<u>4</u>
Blackburn	-	-	PAA10	PAA10	PAA10
Burndy	-	-	UC32R	UC32R	UC32R
Hubbell (Anderson)	LC-83A	LC-52C	LC-52C	LC-52C	LC-52C
Hubbell (Fargo)	GA-9843	GA-9842	GA-9041L	GA-9020L	GA-9020L
Penn-Union	-	-	ARC-12	ARC-11	ARC-14
MacLean (Reliable)	-	-	744AL	600AL	600AL

p - Connectors, Distribution (Parallel Groove)

Applicable Specification: ANSI C119.4

ACSR to Copper or Copperweld-Copper

ACSR Size (Bare Conductor)

	3/0	2/0	1/0	2	4
Alcoa	197	R193	R193	195	195
Blackburn	PAC7	PAC7	PAC345	2CA	4CA
Hubbell (Anderson)	LC-811A	LC-811A	LC-522A	LC-511A	LC-511
Hubbell (Fargo)	GA-9040L	GA-9040L	GA-9020L	GA-9002L	GA-9003L
MacLean (Reliable)	600ALC	555ALC	438ALC	438ALC	438ALC

ACSR Size (Over Armor Rods)

	3/0	2/0	1/0	2	4
Alcoa	201	R197	R197	R197	199
Blackburn	-	-	PAC7	PAC7	PAC7
Hubbell (Anderson)	LC-833	LC-833	LC-811A	LC-811A	LC-811
Hubbell (Fargo)	GA-9843C	GA-9842C	GA-9040L	GA-9020L	GA-9020L
MacLean (Reliable)	-	-	744ALC	600ALC	600ALC

p - Connector, Distribution

Applicable Specification: ANSI C119.4

Copper Type Conductors
Connections to same size or smaller

Bare Conductor

Copperweld Copper Copper	2A	2x3	4A	6A	8A
	0x7			4	6
(s) Blackburn	1/0H	1H	2H	4H	6H
(s) Burndy	KS-25	KS-23	KS-23	KS-20	KS-17
(s) Dossert	DS-10-F	DS-6-F	DS-6-F	DS-3-F	DS-2-F
(s) Greaves	-	A-8	-	A-5	A-3
Hubbell (Anderson)	DG-1/0	DG-1	DG-2	DG-4	DG-6
Hubbell (Fargo)	GC-5020	GC-5002S	GC-5002	GC-5004	GC-5006
(s) Homac	-	1F	2F	4F	6F
(s) ILSCO	IK-1/0	IK-2	IK-2	IK-4	IK-6
(s) Kearney/Cooper Power Systems	118109	118109	118108	118104	118102
(s) Krueger & Hudepohl	UC58C-EV	-	-	-	-
(s) Penn-Union	S1/0	S2	S3	S4	S6
Royal Switchgear	1739	1739	-	-	-

Over Armor Rods

Burndy	KVS-31	KVS-31	KVS-28	KVS-26	KVS-26
Hubbell (Anderson)	K-5	K-4	K-4	K-2	K-2
Hubbell (Fargo)	GC-5035	GC-5035	GC-5040	GC-5020S	GC-5020
ILSCO	IKB-350	IKB-350	IKB-4/0	-	-
(s) Kearney/Cooper Power Systems	118112	118112	118111	118110	118110
Penn-Union	VT-4	VT-3	VT-3	VT-2	VT-1

(s)designates split bolt connectors

Long Connectors (Split Bolt)
Copper to Copper

	2	4	6
Blackburn	2H3	4H3	6H3
Burndy	KS-22-3	KS-20-3	KS-17-3
Dossert	DS5-3	DS3-3	DS2-3
Greaves	A-9	A-6	A-4
Homac	-	4F	6F
Hubbell (Anderson)	C-2-L	C-4-L	C-6-L
Kearney/Cooper Power Systems	118107	118105	118103
Penn-Union	SEL-2	SEL-4	SEL-6

p - Connectors, Service (Parallel Groove)

Applicable Specification: ANSI C119.4
Aluminum-to-Aluminum
Solid or Stranded

	No. 2	No. 4
Alcoa	490.0	490.0
Blackburn	PAE 2121-9	PAE 2121-9
Burndy	UC25R2R	UC25R2R
Hubbell (Anderson)	LC-51A	LC-51A
Hubbell (Fargo)	GA-9002L	GA-9002L
MacLean (Reliable)	APG-1	APG-1
Penn-Union	PCAA-10BF	PCAA-10BF

p - Connectors, Service (Parallel Groove)

Applicable Specification: ANSI C119.4
Aluminum-to-Copper
Solid or Stranded

	<u>2 Al to 4 Cu</u>	<u>4 Al to 6 Cu</u>
Blackburn	PAC345	PAC345
Hubbell (Anderson)	LC-511A	LC-511A
Hubbell (Fargo)	GA-9002L	GA-9002L

p - Connectors, Service

Applicable Specification: ANSI C119.4
Copper-to-Copper
Solid or Stranded

Manufacturer	No. 4	No. 6
Blackburn	4N	6N
Burndy	KP4C	KP6C
Dossert	ES-4	ES-6
Hubbell (Anderson)	4E	6ES
Hubbell (Fargo)	GC-5004	GC-5006
IlSCO	SX-4	SX-6
Maclean (Reliable)	BVC-4	BVC-6
Penn-Union	SX-4	SX-6
Southport	SE-3	SE-2

p - Connectors, Guy Bond (Parallel Groove)

Applicable Specification: ANSI C119.4

ACSR to Guy Strand

	<u>2/0</u>	<u>1/0</u>	<u>2 & 4</u>
Alcoa	396.6	396.6	490.0
Blackburn	PAE 2121-9	PAE 2121-9	PAE 2121-9
Burndy	UC 28R	UCG25R	UCG25R
Dossert	AC103-LW	AC101-LW	AC100-LW
Hubbell (Anderson)	LC-52A-GP	LC-51C-GP	LC-51A-GP
Hubbell (Fargo)	GA-9040L	GA-9040L	GA-9040L
Penn-Union	ALC-15	ALC-10	PCA-010
MacLean (Reliable)	744AL	555AL	438AL

Copper to Guy Strand

AMP	C-LOK Series
Blackburn	K-1
	2HPW (1/4")
	1/0 HPW (3/8")
Burndy	UC8W26L
C & R	CRJC-1
Dossert	UDV 13-1-P
Galvan	K1
Hubbell (Anderson)	LC-511A
Hubbell (Fargo)	GC-8040P
ILSCO	SK-3 (1/4")
	SK-1/0 (3/8")
Joslyn	J8300
Kearney/Cooper Power Systems	9968-1
Krueger & Hudepohl	UC58B-EV
MacLean (Reliable)	438ALC
Penn-Union	JC-1-AC
	(1/4", 3/8" guy strand)
	(1/0 strand copper max.)

p - Connectors, Compression
Applicable Specification: ANSI C119.4

DISTRIBUTION

	Aluminum to aluminum	Aluminum to copper	Copper to copper	Tap Connections (Al to Al, Al to Cu)
Blackburn	Type WR	Type WR	Type CF-1	Type WR
Burndy	"Hycrimp" (Type YH)	"Hycrimp" (Type YH)	Crimpfit" (Type YC-C)	"Cabelok Crimpfit" (Type YP-U)
Homac	H Tap-OB&DB	H Tap-OB&DB	CC	H Tap-OB&DB
Hubbell (Anderson)	AC Series	AC Series	VCUC	VCP
Kearney/Cooper Power Systems	"Squeezeon" (Aluminum)	"Squeezeon" (Aluminum)	"Squeezeon" (Copper)	"Squeezeon" (Aluminum)
Penn-Union	"Press-On" (Aluminum)	"Press-On" (Aluminum)	"Press-On" (Copper)	"Penn-L-Tap"

NOTE: These connectors are acceptable when installed using tools and dies in accordance with the connector manufacturer's recommendations.

p - Connectors, Compression
Applicable Specification: ANSI C119.4

SERVICE

	Aluminum-to-Aluminum Aluminum-to-Copper	Copper-to-Copper
Blackburn	CS, KL ICS-1, IKL (Insulated)	-
Burndy	"Linkits" (Type YSU, YSD) "Insulink"(ES)	"Hysplice" (Types YDS-C, YDS-W)
Homac	"Shure Splicers"	-
Hubbell (Anderson)	VAUS	VHS
Kearney/Cooper Power Systems	"Serv-ens"	-
National Tel. Supply	"Nicopress"	-
Penn-Union	"Penn Sleeves"	-

These connectors are furnished in a variety of sizes to fit all combinations of aluminum and copper service wire.

NOTE: These connectors are acceptable when installed using tools and dies in accordance with the connector manufacturer's recommendations.

p - Connectors, Transmission
Applicable Specification: ANSI C119.4

BOLTED TYPE

ACSR to ACSR
ACSR to Copper

Alcoa 580 Series

Burndy (ACSR to ACSR) UP-A, UP-R

When ordering these clamps specify size, stranding and material of both conductors.

COMPRESSION TYPE

ACSR to ACSR
Same Size

Conductor Size	Alcoa	Blackburn	Burndy	Hubbell (Anderson)	Kearney/Cooper Power Systems
1/0	5074.438	RCJ10	YCS25R	VPUS	OHR-1/0-61AJ
2/0	5074.484	RCJ20	YCS26R	-	OHR-2/0-61AJ
3/0	5075.547	RCJ30	YCS27R	Order	OHR-3/0-61AJ
4/0	5075.609	RCJ40	YCS28R	by	OHR-4/0-61AJ
266.8 kcmil	5076 Order by	RCJ266M	YCS30R	Conductor	HR-266-267AJ
336.4 kcmil	5076 stranding	RCJ336M	YCS33R	Size	HR-336-267AJ

ACSR to Copper

Alcoa 5070 Series
Burndy YCR-R-CA
Hubbell (Anderson) VPUS

(Order by conductor sizes)

NOTE: These connectors are acceptable when installed using tools and dies in accordance with the connector manufacturer's recommendations.

p - Connectors
(wedge type)

Manufacturer	Aluminum-to-aluminum	Aluminum-to-copper	Copper-to-copper	Tap Connections (Al to Al ,Al to Cu)
AMP	AMPACT MINIWEDGE	AMPACT MINIWEDGE	AMPACT C-LOK Series	AMPACT MINIWEDGE
Burndy	WEJTAP	WEJTAP	WEJTAP	WEJTAP
Connector Products, Inc.	Aluminum Tap Connector	Aluminum Tap Connector	-	Aluminum Tap Connector
Homac	Power Tap	Power Tap	-	Power Tap

p - Connectors

Manufacturer	Conditions
<u>Blackburn</u>	
Bolted, insulated	1. For use on 600 volt maximum insulated conductors.
IPC 1102 (#2-1/0 run, #2 tap)	2. To be used only for connecting service drop conductors to service entrance conductors.
IPC 4111 (1/0-4/0 run, #2-1/0 tap)	3. To obtain experience.
IPC 4141 (1/0-4/0 run, 1/0-4/0 tap)	
<u>Homac</u>	
*Compression, Insulated	To obtain experience.
"Shure Splicers"	
Types Q1N and U1N	
<u>Hubbell (Anderson)</u>	
*Compression al to al	To obtain experience.
al to cu "Versa-Crimp" L tap.	
Parallel groove, aluminum	To obtain experience.
LC-52C (1/0 - 6/1 ACSR over armor rods)	
LC-51C (1/0 - 6/1 ACSR)	
<u>Kupler</u>	
Bolted, insulated	1. For use on 600 volt maximum insulated conductors.
130001 (#2-1/0 run, #2 tap)	2. To be used only for connecting service drop conductors to service entrance conductors.
130003 (1/0-4/0 run, #2-1/0 tap)	3. To obtain experience.
130004 (1/0-4/0 run, 1/0-4/0 tap)	
<u>Penn Union</u>	
*Compression, Insulated	To obtain experience.
Type PIK	
<u>Utilco</u>	
Two bolt style, al to al	To obtain experience.
Type PM	

*NOTE: These connectors are acceptable when installed with tools and dies in accordance with the connector manufacturer's recommendations.

q - Bolt, double upset

Applicable Specification: "RUS Specifications for Single and Double Upset Spool Bolts," D-5

Diameter, inches Length, inches	<u>5/8 7</u>	<u>5/8 8</u>	<u>5/8 9</u>	<u>5/8 10</u>
Dixie	D7824	D7826	D7828	D7830
Hubbell (Chance)	-	7826	7828	7830
Joslyn	-	J2394	J2395	J2396
Kortick	K4760	K4761	K4762	K4763
MacLean (Continental)	U31065	U31067	U31069	U31071

*Static proof" designs available.

s - Clevis, secondary swinging

Applicable Specifications: "RUS Specifications for Secondary Swinging Clevises," D-6

Manufacturer	Clevis only*	Clevis with 1-3/4" groove spool	Clevis with 3" groove spool
Dixie	D0352	-	-
Hubbell (Chance)	0352	0352-C909-1032	0352-C909-1034
Joslyn	J0322	-	-
Kortick	K9259	K9109	K9149
MacLean (Continental)	U32043	U36043	U32143

*Catalog Number does not include spool. See page cm for spool type insulators.

u - Deadend for galvanized steel or
aluminum-clad steel guy strand

3-Bolt Guy Clamp

	<u>Light (1/2" bolts)</u>	<u>Heavy (5/8" bolts)*</u>
Dixie	D6450	D6461
Hubbell (Chance)	6450	6461
Joslyn	J930	J931
Kortick	K4124	K4005
MacLean (Continental)	U5273	U5275

U-Bolt Guy Clamp

	<u>Light (3/8" bolts)</u>	<u>Heavy (1/2" bolts)</u>
Hubbell (Chance)	GCU38C	-
Joslyn (Flagg)	PAX-64C	PAX-67C
MacLean (Continental)	GC-64C	GC-67C

Offset Guy Clamp

	<u>Light (1/2" bolts)</u>	<u>Heavy (5/8" bolts)</u>
Hubbell (Chance)	6409	6410
Joslyn	J926	J927

*For use on transmission.

u - Deadend for galvanized steel guy strand

Strand Size:	1/4"	9/32"	5/16"	3/8"	7/16"
<u>Automatic</u>					
<u>MacLean (Reliable)</u>					
Bail for thimble eye	5100	5201	5201	5102	5103
Bail for guy insulator	5150	5251	5251	5152	5153
<u>Formed Type</u>					
<u>Alcoa</u>					
For standard guy*	SGG-610	SGG-710	SGG-0790	SGG-0915	SGG-11-5
<u>Dulmison</u>					
For standard guy*	SGG-0610	SGG-710	SGG-0790	SGG-0915	SGG-1105
<u>Florida Wire & Cable</u>					
For standard guy*	FLA 1300	FLA 1400	FLA 1500	FLA 1600	FLA 1700
<u>Helical Line Products</u>					
For standard guy*	HG-207-1/4"	HG-208-9/32"	HG-209-5/16"	HG-210-3/8"	HG-211-7/16"
<u>Hubbell (Chance)</u>					
For standard guy*	1/4 CTLG	9/32 CTLG	5/16 CTLG	3/8 CTLG	7/16 CTLG
For wrapped guy	1/4 GSC-C	9/32 CTLG-C	5/16 GSC-C	3/8 GSC-C	7/16 GSC-C
<u>Payer Industries</u>					
For standard guy*	25-GNBS		30-GNBS	35-GNBS	38-GNBS
<u>Preformed Line Products</u>					
For standard guy*	GDE-1104	GDE-1105	GDE-1106	GDE-1107	GDE-1108
For wrapped guy	WGL-2100	WGL-2101	WGL-2102	WGL-2103	WGL-2104

*Class B galvanizing. When guy wire has Class C galvanizing, formed deadend should also have Class C galvanizing.

u - Deadend for aluminum clad steel guy strand

Strand Size	3#10 (4M)	7#12 (6M)	7#11 (8M)	7#10 (10M)	7X.110" (11.5M)	7#9 (12.5M)	7X.121" (14M)	7#8 (16M)	7X.148" (20M)
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Formed Type

Aluminum-Clad Steel Guy Strand

<u>Dulmison</u> For standard guy	AWGG 0555	AWGG 0600	AWGG 0685	AWGG 0770	AWGG 0825	AWGG 0870	AWGG 0905	AWGG 0965	AWGG1125
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Helical Line Products
For standard guy

	HG517-6M	HG519-8M	HG521-10M			HG523-12.5M	HG524-14M	HG525-16M	HG528-20M
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Hubbell (Chance)
For standard guy

	6M-AWTLG	8M-AWTLG	10M-AWTLG			12.5M-AWTLG			
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Preformed Line Products

For standard guy
For wrapped guy

AWDE-4108	AWDE-4110 WGL-4110	AWDE-4113 WGL-4113	AWDE-4116 WGL-4116	AWDE-4118	AWDE-4119 WGL-4120	AWDE-4120	AWDE-4122	AWDE-4126	
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Automatic

Aluminum-Clad Steel Guy Strand

Hubbell (Fargo) MacLean (Reliable)	GDE-300 5200	GDE-301 5201	GDE-301 5201	GDE-302 5202					
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v - Guy Attachment
for 5/8" bolt

Type:	Formed Strap	Angle Bolt Eye	Guy Hook	Guy Hook*
Maximum Working Load Rating	23,130 N (5200 lbs.)	23,130 N (5200 lbs.)	23,130 N (5200 lbs.)	37,800 N (8500 lbs.)
Dixie	D5004	D0100	DD-9460	DD-9462
Hubbell (Chance)	5004	0100	-	GH5
Joslyn	J25164	J6500	J6555 J6556	-
Joslyn (Flagg)	-	-	-	P151X
Kortick	K4035 K4047	K3140	-	-
Line Hardware	-	-	-	HGA-58C
MacLean (Bethea)	-	-	-	AG-5
MacLean (Continental)	U31030	U5531	GAD	GAD-56-4
Power Play Products	-	-	-	B58GH
Universal Electric	-	-	-	UGA-56C

*This hook may be used in place of the wrapped guy arrangement in assemblies E3-2 and E3-3.

Pole Eye Plates
(5/8" Bolt)

Type	Pole Eye Plate
Maximum Working Load Rating	37,800 N. (8500 lbs.)
Joslyn (Flagg)	PX88
Hubbell (Anderson)	GSP-05
Line Hardware	PGA-548
MacLean (Bethea)	PE5-6A
MacLean (Continental)	PEP-66-45

v - Guy attachment

Manufacturer	Conditions
<u>MacLean (Continental)</u> Pole Band, UCB-15E	To obtain experience. For distribution lines only and 10,000 lbs maximum loading.
<u>Hubbell (Chance)</u> Pole Band, with cone head bolt 6280, and guy clip 456 6276 (for 6" to 10" pole) 6277 (for 8" to 14" pole)	To obtain experience. For distribution lines only and 10,000 lbs maximum loading.
<u>Joslyn</u> Pole Band, with cone head bolt J-6281, and guy clip J-6275 J-6280 (for 6" to 10" pole) J-6270 (for 8" to 14" pole)	To obtain experience. For distribution lines only and 10,000 lbs maximum loading.

w - Insulators, guy strain
(Fiber Reinforced Plastic)

Ult. Strength, lbs.	11,000	15,000	21,000
<u>Dulmison</u>	HSI1-1P Series	HSI-2X Series	HSI3-2P Series
<u>EPAC</u>	CC Series	CC Series	CC Series
<u>Hubbell (Chance)</u>	-	GS-16	GS-21
<u>Hughes Brothers</u>	-	692 Series	694 Series
<u>Joslyn (Flagg)</u>	150 Series	150 Series	210 Series
<u>K-Line</u>	-	-	KL Series
<u>MacLean (Continental)</u>	G-11 Series GAC 11 Series (for 5/16" guy strand)	G-15 Series GAC 15 Series (for 3/8" guy strand)	G-21 Series -

x - Rod, anchor

Applicable Specification: ANSI C135.2, "Standards for Galvanized Ferrous Strand Eye Anchor Rods."

Applicable Sizes:

- Single guy: 5/8 inch diam. 6, 7 and 8 feet long
3/4 inch diam. 8, 9 and 10 feet long
1 inch diam. 9 and 10 feet long
- Double guy: 5/8 inch diam. 7 and 8 feet long
3/4 inch diam. 8, 9 and 10 feet long
1 inch diam. 9 and 10 feet long
- Single Guy Drive: 5/8 inch diam. 7 and 8 feet long
3/4 inch diam. 8, 9 and 10 feet long
1 inch diam. 9 and 10 feet long
- Double Guy Drive: 5/8 inch diam. 7 and 8 feet long
3/4 inch diam. 8, 9 and 10 feet long
1 inch diam. 9 and 10 feet long

The following manufacturers have shown compliance with the applicable specifications. Some manufacturers cannot supply all sizes listed above. Check with manufacturer or distributor for availability.

Dixie
Eritech (Carolina Galvanizing/Knight)
Hubbell (Chance)
Joslyn
Kortick
Utilities Service
Grip-Tite

Conditional List

x(1)

July 2002

x - Rod, anchor

Applicable Specification: ANSI C135.2 "Standards for Galvanized Ferrous Strand Eye Anchor Rods" except rods are copper covered. Copper coating thickness is 13 mil minimum at any point and a 15 mil average. All purchases should specify that a factory certification to the thickness of the copper must accompany the shipment of the rods.

Applicable Sizes: Double Guy - 3/4 inch diameter, 8 and 9 feet long.

Manufacturer	Conditions
Joslyn	<ol style="list-style-type: none">1. To obtain experience.2. For transmission purposes only.3. For use with log anchors or copper covered plate anchors only.4. To be used with copper coated hardware or bronze hardware underground.

y - Galvanized Steel Strand

Usage: Guy, Distribution or Transmission Line
Overhead Static Wire

ASTM Specification: A 475 - For Guy Strand
A 363 - For Overhead Static Wire

Following grades/diameters of steel wire strands are preferred sizes:

For Guying

Siemens-Martin Distribution Line	High Strength	Extra High Strength Grade	
	Dist. or Trans.	Distribution	Transmission
1/4" dia.	1/4" dia.	1/4" dia.	1/4" dia.
3/8"	9/32"	9/32"	9/32"
7/16"	5/16"	5/16"	5/16"
	3/8"	3/8"	3/8"
	7/16"		7/16"

For Overhead Static Wire (Groundwire)

High Strength	Extra High Strength Grade
3/8" dia.	5/16" dia.
7/16"	3/8"
	7/16"

Alcan Cable
Armco Steel Corporation
Bekaert Steel Wire Corporation
Cal-Wire
Central de Herramientas, S.A. de C.V.
Davis-Walker
Florida Wire and Cable
Indiana Steel and Wire
National Strand Products
Paulsen Wire and Rope Corporation
Seal Wire Company
Southwire

Note: The buyer should specify Class A, B, or C coating per ASTM A363 or A475.

y - Steel Strand

Aluminum-Clad
Specifications: ASTM B415 and B416

For overhead groundwire

(Joint and splice requirements for wire and strand to meet ASTM A363)

AWG Sizes: (a) 7 No. 10, (c) 7 No. 9, (d) 7 No. 8, (e) 7 No. 7 AWG

Intral and Company, Ltd.	(a), (c), (d), (e)
Nehring - Conex	(a), (c), (d), (e)
United States Alumoweld	(a), (c), (d), (e)

For guy strand

(M is rated breaking load in thousand lbs)

M Sizes: 6M (7 No. 12), 8M (7 No. 11), 10M (7 NO. 10), 11.5M (7 x .110"), 12.5M (7 No. 9),
14M (7 x .121"), 16M (7 No. 8), 18M (7 x .139"), 20M (7 x .148")

Alumoclad de Mexico, S.A. de C.V.	8M, 10M, 16M
Intral and Company, Ltd.	6M, 8M, 10M, 12.5M, 16M, 18M, 20M
Nehring - Conex	8M, 10M, 12.5M, 16M, 18M
United States Alumoweld	6M, 8M, 10M, 12.5M, 14M, 20M

y - Aluminum Coated Steel Wire
Applicable Specification ASTM A474

National Strand Products, 3/8"

Distribution Guy Strand

Siemens-Martin
High Strength
Extra High Strength

To obtain experience.

Transmission Guy Strand

High Strength
Extra High Strength

To obtain experience.

Overhead Static Wire

High Strength
Extra High Strength

1. To obtain experience.
2. Must meet the joint requirements of ASTM A363.

y - Zinc - 5% Aluminum - Mischmetal alloy (Zn-5Al-MM) - Coated
Steel Wire Strands
Applicable Specification ASTM A855

Bekaert Corporation

Type/Grade: Nominal diameter (7-wire strand), in.

(HS): 1/4", 5/16", 3/8", & 7/16".
(EHS): 1/4", 5/16", 3/8", & 7/16".

Conditions

Distribution Guy Strand

High Strength (HS)
Extra High Strength (EHS)

To obtain experience.

Transmission Guy Strand

High Strength (HS)
Extra High Strength (EHS)

To obtain experience.

Overhead Static Wire

High Strength (HS)
Extra High Strength (EHS)

1. To obtain experience.
2. Must meet the joint requirements of ASTM A363.

NOTE: Only available with Class C coating.

Indiana Steel & Wire Co.

Type/Grade: Nominal diameter (7-wire strand), in.

(S-M): 1/4", 3/8", & 7/16".
(HS): 1/4", 9/32", 5/16", 3/8", & 7/16".
(EHS): 1/4", 9/32", 5/16", 3/8", & 7/16".

Conditions

Distribution Guy Strand

Siemens-Martin (S-M)
High Strength (HS)
Extra High Strength (EHS)

To obtain experience.

Transmission Guy Strand

High Strength (HS)
Extra High Strength (EHS)

To obtain experience.

Overhead Static Wire

High Strength (HS)
Extra High Strength (EHS)

1. To obtain experience.
2. Must meet the joint requirements of ASTM A363.

NOTE: The buyer should specify Class A, B, or C coating.

z - Anchors, Expanding and Plate

DISTRIBUTION

Designated Maximum holding power-lbs.		6,000	8,000	10,000	12,000
Min. Area (sq. in.)		90	100	120	135
Rod Dia. (inches)		5/8	5/8	3/4	3/4
Rod Length (feet)		7	7	8	-
	<u>Type</u>				
Dixie	4 way Plate	D88100-G -	D88115-G D7502-G	D88135-G -	D88135-G D7504-G
Grip-Tite	8 way	A322812G	A322812G	A322812G	A322812G
Hubbell (Chance)	8 way	88135	88135	88135	88135
Joslyn	8 way	-	J8115	J8135	J8135
Line Hardware	8 way	8-100G	8-115G	8-135G	8-135G
MacLean (Continental)	8 way Plate	UC88100-G -	UC88115-G UC617-G	UC88135-G UC622-G	UC88135-G UC822-G

NOTE: Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

z - Anchors, plate

Applicable Specification: "RUS Specification for Steel Plate Anchors," T-3

TRANSMISSION

Minimum Area 400 sq. in.

	<u>3/4" Galv. Rods</u>
<u>Grip-Tite</u>	XP24 - 3/4 - G
<u>Hubbell (Chance)</u>	X24 - 3/4
<u>Joslyn</u>	J3524 - 3/4
<u>Line Hardware</u>	CP-24G

NOTE: Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

z - Anchors, Service

Designated Maximum Holding Power in Sand - 2500 lbs.

	<u>Screw</u>	<u>Expanding</u>
Dixie	D-6526	-
Eritech (Carolina Galvanizing)	86346606	-
Grip-Tite	-	322065G
Hubbell (Chance)	6346	6870
Joslyn	J6526W-CA	JO870
Line Hardware	-	8-70G
MacLean (Continental)	UC6346-G	UPL62-2.5-G

z - Anchors, Swamp

DISTRIBUTION

	<u>10" dia.</u>	<u>12" dia.</u>	<u>15" dia.</u>
Dixie	D-6710-S	D-6713-S	D-6715-S
Foresight	-	MR-SR*	-
Hubbell (Chance)	10150AS	132AS	152AS
MacLean (Continental)	UC10150A-G	UC122A-G	UC152A-G

*Drive type anchor. Surface area meets or exceeds that of 12" diameter anchors.

NOTE: Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

z - Anchors, Rock

	Expanding Rock Anchors			Rock Guy Bolt
Anchor Size - inches	1-3/4	1-3/4	1-3/4	1-3/4
Rod Length - inches	15	30	53	18
Rod Diameter - inches	3/4	3/4	3/4	1
Hubbell (Chance)	R315	R330	R353	-
Joslyn	J3436	J3437	J3438	-
Kortick	K5503	K5504	K5505	K2377
MacLean (Continental)	UCR315	UCR330	UCR353	U5003

z - Pole keys

Hubbell (Chance)	P-4817
Joslyn	J-4817
MacLean (Continental)	UCP-4817

z - Anchors, Power-installed screw

Manufacturer: Dixie Electrical Manufacturing Company
Multi-Helix Screw Anchors

Working Load Categories				
Soil Type	35,600 N (8,000 lb.)	53,400 N (12,000 lb.)	71,000 N (16,000 lb.)	89,000 N (20,000 lb.)
A1	D-6632	D-6632	D-6636	D-6636
Soil	D-6636	D-6636	D-6637	D-6637
Class 2	D-6637	D-6637	D-6638	D-6638
A2	D-6632	D-6632	D-6636	D-6637
Soil	D-6636	D-6636	D-6637	D-6638
Class 3	D-6637	D-6637	D-6638	
B	D-6632	D-6636	D-6636	D-6638
Soil	D-6636	D-6637	D-6637	
Classes 4 & 5	D-6637	D-6638		
C	D-6636	D-6637	D-6638	
Soil	D-6637			
Classes 6 & 7				

Manufacturer: Hubbell (A. B. Chance Company)
"SS" Multi Helix Anchors

Working Load Categories				
Soil Type	35,600 N (8,000 lb.)	53,400 N (12,000 lb.)	71,000 N (16,000 lb.)	89,000 N (20,000 lb.)
A1	12642-AE	12642-AE	12642-AEJ	12642-AEJ
Soil	12642-AEJ	12642-AEJ	12642-EJN	12642-EJN
Class 2	12642-EJN	12642-EJN	12642-EJNS	12642-ENJNS
A2	12642-AE	12642-AE	12642-AEJ	12642-EJN
Soil	12642-AEJ	12642-AEJ	12642-EJN	12642-EJNS
Class 3	12642-EJN	12642-EJN	12642-EJNS	-
B	12642-AE	12642-AEJ	12642-AEJ	12642-EJNS
Soil	12642-AEJ	12642-EJN	12642-EJN	-
Classes 4 & 5	12642-EJN	-	12642-EJNS	-
C	12642-AEJ	12642-EJN	12642-EJNS	-
Soil	12642-EJN			
Classes 6 & 7				

- NOTES: 1. See RUS Specification T-10 for definitions and explanations.
2. Anchors in the 53,400 N (12,000 lb.) category or above for use on wood poles must be used with hardware commensurate with the working load. Hardware may provide for either single or multiple guy attachments to the anchor.
3. Anchors listed in a specific working load category and/or soil class may generally be used at lower working load categories and/or lower numerical soil classes.

z - Anchors, Power-installed screw

Manufacturer: Joslyn
"PS" Screw Anchors

Working Load Categories				
Soil Type	35,600 N (8,000 lb.)	53,400 N (12,000 lb.)	71,000 N (16,000 lb.)	89,000 N (20,000 lb.)
A1	J23380ACA	J23380ACA	-	-
Soil	J23381ACA	J23381ACA	-	-
Class 2	J23383ACA	J23383ACA	-	-
A2	J23380ACA	J23380ACA	J23381ACA	J23383ACA
Soil	J23381ACA	J23381ACA	J23383ACA	J29726ACA
Class 3	J23383ACA	J23383ACA	J29726ACA	
B	J23380ACA	J23380ACA	J23381ACA	J29726ACA
Soil	J23381ACA	J23383ACA	J23383ACA	-
Classes 4 & 5	J23383ACA	-	J29726ACA	-
C	J23381ACA	J23383ACA	J29726ACA	-
Soil	J23383ACA	-	-	-
Classes 6 & 7				

- NOTES: 1. See RUS Specification T-10 for definitions and explanations.
2. Anchors in the 53,400 N (12,000 lb.) category or above for use on wood poles must be used with hardware commensurate with the working load. Hardware may provide for either single or multiple guy attachments to the anchor.
3. Anchors listed in a specific working load category and/or soil class may generally be used at lower working load categories and/or lower numerical soil classes.

z - Anchors

Manufacturer	Conditions
<u>Bathurst</u> Screw anchors, power installed BMS-003 (6,000 lbs.) BMS-003R (5/8" rod) BMS-004 (10,000 lbs.) BMS-004R (3/4" rod)	To obtain experience.
<u>Dixie</u> Screw anchors, power installed D-1162-G (6,000 & 8,000 lb., 5/8" rod) D-1375-G (10,000 & 12,000 lb., 3/4" rod)	To obtain experience.
<u>Foresight</u> MR-1, MR-2, MR-3, MR-4	1. To obtain experience. 2. Each installation must be proof tested. Maximum rating is test value achieved.
<u>Hubbell (Chance)</u> Screw anchors, power installed 024462 (6,000 and 8,000 lb.) 12332P (5/8" rod) 12587 (5/8" thimbleye nut) 024484 (10,000 and 12,000 lb.) 12632P (3/4" rod) 6512 (3/4" thimbleye nut)	To obtain experience.
<u>Joslyn</u> Screw anchors, power- installed J11B-CA (6,000 & 8,000 lb., 5/8" rod) J13C-CA (10,000 & 12,000 lb., 3/4" rod)	To obtain experience.

NOTES: Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

Catalog numbers shown for screw anchors are for anchors with 1-3/8" hubs. Equivalent anchors with 1-1/2" hubs are also acceptable. (A special installing wrench is required.)

aa, ab
January 2003

aa - Nut, eye
ab - Nut, thimble eye

	aa		ab	
	Eye Nut Conventional		Eye Nut Eyelet	Thimble Eye Nut
	5/8"	3/4"	5/8"	5/8"
Berny's Forging Co.	OE1	-	-	-
Dixie	D6502	-	DD-6517	D6510
Hubbell (Chance)	6502	-	B14A	6510
Hughes	EN60	-	-	-
Joslyn	J1092	J1093	J1126	J6510
Kortick	K4212	-	K4413	K3111
Line Hardware	OEN-58	-	BEL-58	-
MacLean (Continental)	EN-5	-	BE-5	TN-5

ac - Brace, sidearm diagonal

	1-1/2 inch angle 3/16" x 5'	1-3/4 inch angle 3/16" x 7'
Hubbell (Chance)	-	6984
Joslyn	-	J1525
Kortick	K1951	K1954
MacLean (Continental)	U5210	U5212

ae - Surge (lightning) Arrester, Distribution Class

SiC Type

Manufacturer	Type	Ratings, kV	Housing	Duty
ABB	LV	9/10	Porcelain	Normal
	LVBB	9/10, 18	Porcelain	Heavy
General Electric	Alugard	9, 10, 18	Porcelain	Heavy
Kearney/Cooper Power Systems	Unigap	9, 10, 18	Porcelain	Heavy

MOV Type

Manufacturer	Type	Ratings, kV	Housing	Duty
Cooper Power Systems	AZL VariSTAR	9, 10, 18, 27	Porcelain	Heavy

ae - Surge (Lightning) Arresters, Substation*

SiC Type				
Manufacturer	Type	Accepted Ratings - kV	Housing	Manufacturer's Classification
ABB	LV	3-20	Porcelain	Distribution
	IVL	3-120	Porcelain	Intermediate
	CPL	3-312	Porcelain	Station
General Electric	Alugard	3, 9, 10, 18	Porcelain	Distribution
Kearney/Cooper Power Systems	Unigap	3, 9, 10, 18	Porcelain	Distribution

MOV Type				
Manufacturer	Type	Accepted Ratings - kV	Housing	Manufacturer's Classification
Hubbell Power Systems (Ohio Brass)	DynaVar			
	VLA	3-27	Porcelain	Station
	VL	3-48	Porcelain	Station
	VN	54-312	Porcelain	Station

*For instructions concerning application at substations, refer to RUS Bulletin 1724E-300, "Guide for the Design of Substations for Electric Borrowers." In the purchase of arresters, care should be taken to select the type and voltage ratings in accordance with the line voltage and the type of construction (grounded or ungrounded).

ae - Surge (Lightning) Arresters, Distribution Class

CONDITION OF ACCEPTANCE: To Obtain Experience

MOV Type				
Manufacturer	Type	Ratings, kV	Housing	Duty
ABB	HMX	9,10,18	Porcelain	Heavy
	XPH	9,10,18,27	Polymer	Heavy
Cooper Power Systems	AZS VariSTAR	9,10,18,27	Porcelain	Normal
	UNS Ultra Sil Housed VariSTAR	9,10,18,27	Polymer	Normal
	UHS Ultra Sil Housed VariSTAR	9,10,18,27	Polymer	Heavy
General Electric	Tranquell, 9L23 Series	9,10,18,27	Polymer	Heavy
Hubbell Power Systems (Ohio Brass)	DynaVar PDV-65	9,10,18,27	Polymer	Normal
	DynaVar PDV-100	9,10,18,27	Polymer	Heavy
Joslyn	ZNP	9,10,18,27	Polymer	Normal
	ZHP	9,10,18,27	Polymer	Heavy
Raychem Corporation	HDA Series	9,10,18,27	Polymer	Normal

MOV Type (Internally Gapped)				
Manufacturer	Type	Ratings, kV	Housing	Duty
Cooper Power Systems	AZL500 VariGAP	9,10,18,27	Porcelain	Heavy
	CPS AZS500 VariGAP	9,10,18,27	Polymer	Normal
	UNG UltraSIL VariGAP	9,10,18,27	Polymer	Normal
	UHG UltraSIL VariGAP	9,10,18,27	Polymer	Heavy

ae - Surge Arrester, Substation*

CONDITION OF ACCEPTANCE: To Obtain Experience

MOV Type

Manufacturer	Type	Accepted Ratings - kV	Housing	Manufacturer's Classification
ABB	SMX-30	3-312	Porcelain	Station
Cooper Power Systems	VariStar	3-312	Porcelain	Station
	VariStar AZF	3-120	Porcelain	Intermediate
	VariSTAR UI	3-108	Polymer	Intermediate
	VariSTAR US	3-108	Polymer	Station - 3.4 kJ/kV
	VariSTAR UH	3-108	Polymer	Station - 5.6 kJ/kV
General Electric	Tranquell	2.7-612	Porcelain	Station
	Tranquell	3-120	Porcelain	Intermediate
Hubbell Power Systems (Ohio Brass)	PVI-LP	3-72	Polymer	Intermediate
	PVIA	3-72	Polymer	Intermediate
	DynaVar Type PVI	3-144	Polymer	Intermediate
	DynaVar Type PVN	3-228	Polymer	Station
Joslyn	Type ZS	3-240	Porcelain	Station
	Type ZSH	258-468	Porcelain	Station
	Type ZIP	3-120	Polymer	Intermediate
	Type ZSP	3-144	Polymer	Station
MagneTek	ZSE-E2A	3-39	Porcelain	Station
	ZSE-E3A	45-312	Porcelain	Station
Siemens Power	3EQ1	36-240	Polymer	Station
	3EQ4	96-444	Polymer	Station
	3EP2	12-384	Porcelain	Station
	3EP4	12-150	Porcelain	Station

*For instructions concerning application at substations refer to RUS Bulletin 1724E-300, "Design Guide for Rural Substations." In the purchase of arresters, care should be taken to select the type and voltage rating in accordance with the line voltage and the type of construction (grounded or ungrounded).

af - Cutouts, Distribution, Open

Manufacturer	Type	Voltage Rating
ABB	ICX	15, 27 kV
	LBU-II	15, 27 kV
Cooper Power Systems	S1	15, 27 kV
	L	15, 27 kV
Hubbell (Chance)	C	15, 27, 35 kV
	C (loadbreak)	15, 27, 35 kV
Kearney/Cooper Power Systems	HX	15, 27 kV
Power Line Hardware	DHC	15, 27 kV
S & C Electric	XS	15, 27 kV
Southern States	Series 66	15, 27 kV
	Series 70	15 kV

NOTE: The buyer should specify the load rating, voltage rating, interrupting rating and required accessories.

Cutouts used on underground riser poles should be loadbreak type or have hooks for portable load interrupters.

af - Cutout, open-link fuse support

Manufacturer	Mounting	12.5/7.2 kV 50 amp.	24.9/14.4 kV 50 amp.
Cooper Power Systems	Crossarm Bushing	FT1A2	FT1A4
		FT10A3	-
Kearney/Cooper Power Systems	Crossarm Bushing	6484-55	-
		6483-59	-

NOTE: The open link fuse supports listed above are fuse supports only and have no inherent interrupting capacity. They should be used with fuse links capable of interrupting at least 1200 amperes and for transformer protection only.

af - Power Fuses, Substation

Manufacturer	Type	Voltage Rating (kV)
Eaton (Cutler-Hammer)	RDB (Boric acid, refillable)	15-34.5
	DBA (Boric acid, non-refillable)	46-69
	DBU (Boric acid, non-refillable)	15-34.5
Kearney/Cooper Power Systems	HX	15
	HX	27
S & C Electric*	SMD (Boric Acid)	15-138
Southern States	Series P	15-161

*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators 34.5 kV on request.

NOTE: All fuses listed on this page should be furnished with NEMA standard insulators. The buyer should specify the current rating, voltage rating, interrupting rating and required accessories.

Conditional List
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af - Cutouts, Distribution, Open
with Linkbreak Attachment

Manufacturer	Type	Voltage Rating	Conditions
Hubbell (Chance)	C	15, 27 kV	1. To obtain experience. 2. Limited to 100 amp cutouts. 3. To be used only with Hubbell (Chance), Cooper and Kearney fuses. Will not break S&C and some other fuse types.

ag - Fuses, Current Limiting, Backup

Manufacturer	Conditions
<u>ABB</u> 15 kV Class Type CLTX, 25K/15T 25 kV Class Type CLTX, 25K/15T	1. To obtain experience. 2. Must be used in series with external expulsion fuse 25K OR 15T or smaller or with CSP transformers 50 kVA or smaller.
<u>Cooper Power Systems</u> 15 kV Class FAH series 25 kV Class FAH series	Same as above.
<u>General Electric</u> 15 kV Class 9F59U Series 25 kV Class 9F59U	Same as above.
<u>High-Tech Fuses</u> 15 kV Class No. HTDE23 (X)025 25 kV Class No. HTDE24 (X)025 35 kV Class No. HTDE25 (X)025	Same as above.
<u>Hubbell (Chance)</u> 15 kV Class Type K-Mate 25 Catalog No. C70L-31KA 25 kV Class Type K-Mate 25 Catalog No. C70L-32KA	Same as above.

ah - Tie, insulator, formed type

Manufacturer	Type
<u>Dulmison</u>	LT "Longspan" top tie (Order for specific conductor size and insulator) ST side tie (Order for specific conductor size and insulator) Type SPL* (Side tie for use on spool insulator with 1-3/4" groove) DBST double side tie (Order for specific conductor size and insulator) DST double support tie (Order for specific conductor size and insulator)
<u>Helical Line Products</u>	HTT Series (Order for specific conductor size and insulator)
<u>Hubbell (Chance)</u>	Super Top-Tie, Type STT for single or double support use, with insulators 2-1/4" through 3-1/2" neck diameter and single support use on spool insulators with 1-3/4" groove diameter (Order for specific conductor size.)
<u>Preformed Line Products</u>	WT "Wraplock" (Order for specific conductor size and insulator) ST "Groove-Formed" side tie (Order for specific conductor size and insulator) Spool Tie for ACSR, Type SPL* (Side tie for use on spool insulator with 1-3/4" groove) DST double support top tie (Order for specific conductor size and insulator) DBST double side tie (Order for specific conductor size and insulator)

*Not for side mounting on pin or post insulators.

ah - Tie, insulator, formed type

Manufacturer	Conditions
Dulmison Type QSPL "Quick Spool" spool tie (Order for specific conductor size)	To obtain experience.
Preformed Line Products EZ-WRAP* spool tie (order for specific conductor size)	To obtain experience.

*Not for side mounting on pin or post insulators.

ai - Rods, Ground

Applicable Size: The standard length is 8 feet and catalog numbers listed below are for this length. Longer rods may be required for special conditions.

Copper-covered ground rods are listed with a 13 mil minimum at any point and a 15 mil average covering of copper. All purchases should specify that a factory certification of the thickness of the copper must accompany the shipment of the rods.

Copper-covered steel rods

	<u>5/8"</u>	<u>3/4"</u>
Alumoclad	AL- 588	-
Apache	588R	-
Blackburn	625813MX	-
Boggs	EB-810-13	-
Eritech (Carolina Galvanizing/Knight)	615883	-
Galvan	6258G13	-
Joslyn	J8338-13	-
Korns	KCG588-13	-
Republic Wire	RGC5883	-
South Atlantic, LLC (Southern Grounding)	C58813	C34813
Wilcor	WA588C	-

Stainless Clad Steel

<u>Manufacturer</u>	<u>5/8"</u>	<u>3/4"</u>
Teledyne (MEFCO)	"PERMAGROUND"	"PERMAGROUND"

ai - Rods, Ground

Applicable Size: The standard length is 8 feet and catalog numbers listed below are for this length. Longer rods may be required for special conditions.

Hot Dip Galvanized Steel

Manufacturer	5/8"	3/4"
Blackburn	-	GR7508
Boggs	G588	G348
	PTG588**	PTG348**
Dixie	D8578	D8618
Erico	G588	G348
	G588PT**	G348PT**
Eritech (Carolina Galvanizing/Knight)	815880	813480
	815889**	813489**
Galvan	GR6258	GR7508
	GR6258P**	GR7508P**
General Electric	0982-00002	0982-00003
Grip-Tite	GT588	GT348
Hubbell (Chance)	8578	8618
	C203-0107**	C203-0109**
	C203-0377*	-
	GT588PT**	GT348PT**
Joslyn	J5328	J5338
Korns	KG58	KG34
Kortick	K4658	K4678
Line Hardware	GR-588G	GR-348G
Lloyd	6258H	7508H
MacLean (Continental)	U5307	U6338
Porcelain Products	7338	7348
South Atlantic, LLC (Southern Grounding)	Z588	Z348
Wilcor	WA8580G	WA8340G

Electro-Galvanized Steel

Apache	G588	G348
	G588PT**	G348PT**
Blackburn	GR6258	-
Calpico	G8580	-
LMP	6258E**	7508E**

Stainless Steel

Galvan	S6258	S7508
Teledyne (MEFCO)	TDY Sol	TDY Sol
Wilcor	WA 588-S	WA348-S

*Rod furnished with clamp.

**Rod furnished with 4 ft., No. 6 tinned or galvanized copper pigtail.

ai - Rods, ground, sectional

Galvanized steel and
copper-covered steel

Copper-covered ground rods are listed with a 13 mil minimum at any point and a 15 mil average covering of copper. All purchases should specify that a factory certification of the thickness of the copper must accompany the shipment of the rods. Rods are copper-covered unless marked galvanized steel.

Sectional Ground Rods

Manufacturer	8' long	10' long	Coupling	Driving studs
Blackburn	6258S13MX	6260S13MX	60C 60CNT2*	60DS 60DSNT*
Demark Galv. Steel	-	-	GRC 58B* GRC 58G*	-
Eritech (Carolina Galv./Knight)			CR-58	
	635883	635803	CC-58*	DSH 58
Galv. Steel	835880	835800	GC 58	DSH 58
Galv. Steel	833480	833400		DSH 34
Galvan	-	-	GRC-58G**	-
	-	-	GRC-34G**	-
Galv. Steel	G25G13S	6260G13S	60-C	60-DS
	-	-	60-TC**	-
Hubbell (Chance) Galv. Steel	C203-0052	8512	8611	-
Joslyn	-	-	J9182	J9186
Galv. Steel	-	-	J23282A	-
South Atlantic, LLC (Southern Grounding)	CS58813	CS581013	-	-
	CS34813	CS341013	-	-

*Threadless coupling or drive head

aj - Clamp, Ground Rod

Manufacturer	For 5/8" Copper-Covered Rod	For 3/4" Galv.or Stainless Steel Rod	For 5/8" Galv.or Stainless Steel Rod
AMP	C-LOK Series	81412-1	81412-1
Blackburn	G5	-	-
Boggs	G31	-	-
Burndy	GRC58	-	-
C & R Products	CRGC-58	-	-
Connector Castings	G5	-	-
Dossert	GNL62H	-	-
*Erico (Cadweld)			
1 ground wire	GR1-161G	GR1-181G	GR1-161G
2 ground wires	GT1-161G	GT1-181G	GT1-161G
Eritech (Carolina Galv./Knight)	CP 58	UCSS	-
Galvan	G5	-	-
Greaves/Mercury	G-580	-	-
Hubbell (Anderson)	GC-5	-	-
Ilsco	GRC-58	-	-
Joslyn	J8392AB	J25985	J25932
Kortick	K4647	-	-
Lew Electric Fittings	GRC-5/8"	-	-
Line Hardware	RC-58CE	-	-
Penn-Union	CEB-2	CEB-3-TN	CEB-2-TN
MacLean (Reliable)	E58	3459	3459
*Thermoweld	Type CR-1	Type CR-1	Type CR-1
	M-2012	M-2017	M-2012
Wilcor	HGR5/8	WAU 5834-B	WAU 5834-B

*Includes disposable molds.

Conditional List

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aj - Clamp, ground rod

Manufacturer	Conditions
<u>Burndy</u> YGHP (for 5/8" copper-covered rods)	To obtain experience.
<u>DeMark</u> Copperhead (for 5/8" copper-covered, galvanized, and stainless rods)	To obtain experience.
<u>Line Hardware</u> RC-34 (for 5/8" and 3/4") galvanized or stainless steel ground rods	To obtain experience.
<u>Thomas & Betts</u> DGC58-44 (#4 copper ground wire) DGC58-66 (#6 copper ground wire) (for 5/8" copper-covered rods)	To obtain experience.

al - Staples, ground wire

Applicable Specification: ANSI C135.14, "Standards for Staples with Rolled or Slash Points."

Length x Spread (inches) Diameter	1-1/2 x 1/4 9 gauge Galv. Steel	2 x 1/2 8 gauge Galv. Steel	1-1/2 x 3/8 8 gauge Copper-Coated	3 x 1-1/16 1/4 Moulding
Apollo	AP52I-S1672G	AP52I-S1570	AP50I-S6652	AP500-S6497
Copperweld Southern	-	CP52	-	-
FWC	FW1672G	FW157	FW6652	FW6497
Hubbell (Chance)	C205-0247	C205-0216	9167	9161
Joslyn	J1672G	J157	J6652	J6497
Kortick	-	-	K247	K236
Larson	-	350453	750233	721312
Lindsey	10248	-	-	10270
Redmore Products	SCSG1525148	SDSG2050162	SCCC1538162	SDSG3090250
MacLean (Continental)	U88	U86	U48	U46

Barbed staples, ground wire

Length x Spread (inches) Diameter	1-1/2 x 3/8 .131 Galv. Steel	2 x 5/8 .165 Galv. Steel	1-1/2 x 3/8 .140 Copper-Coated	3 x 1-1/16 7/32 Galv. Steel
Apollo	AP520-57488HTG	AP50I-S66525		
Joslyn	J7656	J7672	J7682	J7664
Redmore Products		TDSG2063187	TCCC1538162	TDSG3090250

Staples, alumoweld

Length x Spread (inches) Diameter	2 x 1/2 8 gauge	1-1/2 x 3/8 8 gauge	3 x1-1/16 1/4 moulding
Apollo	AP531-S6655AL	AP531-S6652AL	AP530-S7493AL
Redmore Products			SDAA3090250

Clip, ground wire

Kearney/Cooper Power Systems 12326

Conditional List
al(1)
July 2002

al - Staples, Ground Wire

Clip, Ground Wire

Manufacturer	Conditions
<u>Fastex (ITW)</u> No. 780-2	To obtain experience.

an - Transformers, distribution, pole type
Primary Voltages 7.2/12.5, 7.62/13.2 and 14.4/24.9 kV

Applicable Specifications: "RUS Specifications for Rural Distribution Transformers," D-10

Listing is by type rather than by catalog number because of the many possible combinations of voltage, kVA and taps and protective equipment.

	7.2/12.5 & 7.62/13.2	14.4/24.9	Dual Voltage
<u>ABB</u>			
Conventional, single bushing	S-B3	S-B3	S-B3
Self-protected, single bushing	CSP-B3	CSP-B3	CSP-B3
Conventional, two bushing	S-A	S-A	S-A
Type S-B3 may also be obtained with internal fuse, with internal fuse and double gap, and with lightning arrester and open link cutout (Type PC).			
<u>Arkansas Electric Cooperative</u>			
Conventional, single bushing	ASE	-	-
<u>Central Moloney</u>			
Conventional, single bushing	AOD	AOD	AOD
Conventional, two bushing	AOD	AOD	AOD
Self-protected, single bushing	DVP	DVP	DVP
The single bushing transformer may also be obtained with bushing mounted cutout and lightning arrester, and with internal fuse and double gap.			
<u>Cooper Power Systems¹</u>			
Conventional, single bushing	REA-Conv	REA-Conv	REA-Conv
Self-protected, single bushing	REA-CSP	REA-CSP	REA-CSP
Conventional, two bushing	REA-Conv	REA-Conv	REA-Conv
Conventional single bushing type may also be purchased with external overload protection and double gap and with bushing mounted cutout and lightning arrester.			

Note:

1. Available with optional covers insulated for 15 KV dielectric strength at additional cost. (Transformer covers with higher electrical insulation, together with other coordinated electrical insulating protective measures, should help to significantly lessen shock and electrocution hazards to raptors, other birds, and small mammals.)

an - Transformers, distribution, pole type
Primary Voltages 7.2/12.5, 7.62/13.2 and 14.4/24.9 kV

	7.2/12.5 & 7.62/13.2	14.4/24.9	Dual Voltage
<u>ERMCO</u> ¹			
Conventional, single bushing	CONV	CONV	CONV
Conventional, two bushing	CONV	CONV	CONV
Self-protected, single bushing	CSP	CSP	CSP

The single bushing transformer may also be obtained with double gap and internal fuse (Type DG) or lightning arrester and external cutout (Type COLA).

Dead-front for use in enclosure: Add "R" (Radial) or "LF" (Loop feed) to designation

General Electric

Conventional, single bushing	HS	HS	HS
Self-protected, single bushing	HSBA	HSBA	HSBA
Conventional, two bushing	HS	HS	HS

Type HS may also be obtained with internal fuse, with internal fuse and double gap, with bushing mounted cutout and double gap, and with bushing mounted cutout arrester (Type HSCA).

Howard Industries

Conventional, single bushing	REC-C	REC-C	REC-C
Conventional, two bushing	Conv-2B	Conv-2B	Conv-2B
Self-protected, single bushing	REC-P	REC-P	REC-P

Kuhlman

Conventional, single bushing	I	I	I
Conventional, two bushing	B	B	B
Self-protected, single bushing	H	H	H

Type I may also be purchased with internal fuse, with internal fuse and double gap (Type G), and with bushing mounted cutout and lightning arrester (Type J).

Note:

1. Available with optional covers insulated for 15 KV dielectric strength at additional cost. (Transformer covers with higher electrical insulation, together with other coordinated electrical insulating protective measures, should help to significantly lessen shock and electrocution hazards to raptors, other birds, and small mammals.)

an - Transformers, distribution, pole type
Primary Voltages 7.2/12.5, 7.62/13.2 and 14.4/24.9 kV

	7.2/12.5 & 7.62/13.2	14.4/24.9	Dual Voltage
<u>Magnetic Electric</u>			
Conventional, single bushing	AOD	AOD	AOD
Conventional, two bushing	AOD	AOD	AOD
Self-protected, single bushing	AOD	AOD	AOD
<u>Sesco</u>			
Conventional, single bushing	RU	-	-
Self-protected, single bushing	ESP	-	-
Conventional, two bushing	CONV	-	-
Type RU may also be purchased with internal fuse and/or lightning arrester.			
<u>United (Ky. AEC)</u>			
Conventional, single bushing	SC	SC	DSC
Conventional, two bushing	SC	SC	DSC
Self-protected, single bushing	SCP	SCP	DSCP
SC and DSC may be purchased with external fuse and arrester (SP and DSP)			
<u>VanTran</u>			
Conventional, single bushing	CR	-	-
Self-protected, single bushing	CSP-R	-	-
Conventional, two bushing	CD	-	-

an - Transformers, Power
Single-Phase, Step-Down for Distribution Substation Use

Manufacturer	Primary Voltage - kV	Nominal OA Capacity (kVA)	
		167 - 833	1250 - 10,000
<u>ABB</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115		X
<u>Central Moloney</u>	34.4	X	
<u>Cooper Power Systems</u>	34.4	X	X
	43.8	X	X
<u>General Electric</u>	34.4	X	X
	43.8	X	X
	67.0		
	115	X	X
	138		X
<u>Kuhlman</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115		X
<u>Pennsylvania Transformer Technology, Inc.</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
<u>Waukesha Electric Systems</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115		X

All acceptances are based on RUS Specification S-3: Specifications for Step-Down Distribution Substation Transformers, and, 15 kV or 25 kV class secondary voltages.

115 kV and 138 kV transformers may have one step reduced BIL.

an - Transformers, Power
Three-Phase, Step-Down for Distribution Substation Use

Manufacturer	Primary Voltage - kV	Nominal OA Capacity	
		750 to 3750 kVA	5 to 30 MVA
<u>ABB</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115		X
	138		X

Transformers 5 MVA and larger also accepted as load tap changing transformers using ABB Types UTS-A, UTT-B and UVW load tap changers.

<u>Cooper Power Systems</u>	34.4	X	X
	43.8	X	X

Transformers 5 MVA and larger also accepted as load tap changing transformers using Cooper Types 550, 550B and 550C load tap changers.

<u>General Electric</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115		X
	138		X

Transformers 5 MVA and larger also accepted as load tap changing transformers using General Electric Types LR72, LR65, and LRT-200 load tap changers.

<u>Kuhlman</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115		X
	138		X

Transformers 5 MVA and larger also accepted as load tap changing transformers using Siemens-Allis Types TLS and TLH load tap changers

Notes:

All acceptances are based on RUS Specification S-3: Specifications for Step-Down Distribution Substation Transformers, and, 15 kV or 25 kV class secondary voltages.

115 kV and 138 kV transformers may have one step reduced BIL.

an - Transformers, Power
Three-Phase, Step-Down
for Distribution Substation Use

Manufacturer	Primary Voltage - kV	Nominal OA Capacity	
		750 to 3750 kVA	5 to 30 MVA
<u>Pennsylvania Transformer Technology, Inc.</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115		X
	138		X

Transformers 5 MVA and larger also accepted as load tap changing transformers using Cooper Types 550, 550B and 550C load tap changers.

<u>Waukesha Electric Systems</u>	34.4	X	X
	43.8	X	X
	67.0	X	X
	115	X	X
	138		X

Transformers 5 MVA and larger also accepted as load tap changing transformers using ABB Type UZE; Reinhausen RMT-1; Reinhausen RMV-2; or Waukesha Electric Systems Type UZD load tap changers.

Notes:

All acceptances are based on RUS Specification S-3: Specifications for Step-Down Distribution Substation Transformers, and, 15 kV or 25 kV class secondary voltages.

115 kV and 138 kV transformers may have one step reduced BIL.

an - Transformers, Distribution, Pole Type

Manufacturer	Conditions
<u>ABB</u>	
7.2/12.5, 7.62/13.2 14.4/24.9 kV & Dual Voltage	
Single-phase, single bushing, 25 and 50 kVA pole type distribution transformers with amorphous metal cores.	To obtain experience.
Single-phase, single bushing and two-bushing with internal UMX Under-oil Arrester or with internal "Tranquell" Under-oil Arrester.	To obtain experience.
<u>Cooper Power Systems¹</u>	
7.2/12.5, 7.62/13.2, 14.4/24.9 kV and Dual Voltage	
Single-phase, single bushing, self-protected, with Magnex Interrupter	To obtain experience.
Above or Conventional, single or two bushing; Type REA Conv. or Self-protected, single bushing Type REA-CSP with Type AZU, MOV, heavy-duty under-oil arrester.	To obtain experience.
<u>Ermco¹</u>	
7.2/12.5 and 7.62/13.2 and 14.4/24.9 kV	
Single-phase, single bushing with internal Tranquell Under-oil Arrester	To obtain experience.

Note:

1. Available with optional covers insulated for 15 KV dielectric strength at additional cost. (Transformer covers with higher electrical insulation, together with other coordinated electrical insulating protective measures, should help to significantly lessen shock and electrocution hazards to raptors, other birds, and small mammals.)

an - Transformers, Distribution, Pole Type

Manufacturer	Conditions
<u>General Electric</u> 7.2/12.5, 7.62/13.2, 14.4/24.9 kV and Dual Voltage	
Single-phase, single bushing, and two bushing with internal Tranquell under-oil arrester	To obtain experience.
Single-phase, single bushing and two bushing, 10 - 50 kVA pole type distribution transformers with amorphous metal cores	To obtain experience.
Single-phase, single bushing and two bushing pole type distribution transformers with G.E. high voltage switch	To obtain experience.
<u>GE-Prolec</u> 12.47/7.2, 13.2/7.62, & 14.4/24.9 kV; 5 through 50 kVA Single bushing and two bushing Conventional & self-protected and 12.47/7.2 x 24.9/14.4 dual voltage	To obtain experience.
<u>Howard Industries</u> 7.2/12.5, 7.62/13.2, 14.4/24.9 kV and Dual Voltage	
Single-phase, single bushing, and two bushing with internal "AZU" or "Tranquell" under-oil arrester	To obtain experience.
Single-phase, single bushing, and two bushing; 5 - 50 kVA; with or without taps, with amorphous metal cores	To obtain experience.
<u>Kuhlman</u> 7.2/12.5 kV and 7.62/13.2 kV Toroform design 10, 15, & 25 kVA	To obtain experience.
<u>NECO</u> 7.2/12.5 kV and 14.4/24.9 kV Single-phase, two bushing, 10-50 kVA, Conventional	To obtain experience.
<u>VanTran</u> 14.4/24.9 kV and Dual Voltage	
Conventional, single bushing Type CR	To obtain experience.
Conventional, two bushing Type CD	To obtain experience.
Self-protected, single bushing Type CSP-R	To obtain experience.

an - Transformers, Distribution, Pole Type
with non-porcelain secondary bushings

Manufacturer	Conditions
<u>Cooper Power Systems</u> Fully or conditionally accepted with Central Moloney polymer secondary bushings	To obtain experience.
<u>ERMCO</u> ¹ Fully or conditionally accepted with Central Moloney polymer secondary bushings	To obtain experience.
<u>Howard Industries</u> Fully or conditionally accepted with Central Moloney polymer secondary bushings	To obtain experience.
<u>Kuhlman</u> Fully or conditionally accepted with Central Moloney polymer secondary bushings	To obtain experience.
<u>Magnetic Electric</u> Fully accepted with Central Moloney polymer secondary bushings	To obtain experience.
<u>United (Ky. AEC)</u> Fully accepted with Central Moloney polymer secondary bushings	To obtain experience.

Note:

1. Available with optional covers insulated for 15 KV dielectric strength at additional cost. (Transformer covers with higher electrical insulation, together with other coordinated electrical insulating protective measures, should help to significantly lessen shock and electrocution hazards to raptors, other birds, and small mammals.)

an - Transformers, Power
Single-Phase, Step-Down
for Distribution Substation Use

Conditions for Acceptance: "E" - To obtain experience
"T" - Manufacturer to furnish RUS with satisfactory test results
(Only performance specifications have been submitted)

Manufacturer	Primary Voltage - kV	Nominal OA Capacity (kVA)	
		167 - 833	1250 - 10,000
<u>Delta-Star</u>	34.4	E	E
	43.8	E	E
	67.0	E	T
	115	-	T
<u>ESCO</u>	34.4	E	-
<u>Ferranti-Packard</u>	67.0	T	E

All acceptances are based on RUS Specification S-3: Specifications for Step-Down Distribution Substation Transformers, and 15 kV or 25 kV class secondary voltages.

115 kV and 138 kV transformers may have one step reduced BIL.

an - Transformers, Power
Three-Phase, Step-Down
for Distribution Substation Use

Conditions for Acceptance: "E" - To obtain experience

"T" - Manufacturer to furnish RUS with satisfactory test results
(Only performance specifications have been submitted)

Manufacturer	Primary Voltage - kV	Nominal OA Capacity	
		750 to 3750 kVA	5 to 30 MVA
<u>Delta Star</u>	34.4	E	E
	43.8	E	E
	67.0	E	E
	115	-	E
	138	-	T

Transformers 5 MVA and larger also accepted as load tap changing transformers using Seimens-Allis Types TLS and TLH-21 load tap changers.

<u>Pauwels Transformers</u>	34.4	-	E
	67.0	-	E
	115	-	E
<u>Ferranti-Packard</u>	34.4	E	T
	67.0	T	E
	115	-	E

<u>GE-Prolec</u>	115	-	E
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Transformers 5 MVA and larger also accepted as load tap changing transformers using General Electric Types LR72, LR65, and LRT-200 load tap changers.

<u>MGM</u>	34.4	E	T
	43.8	E	T
	67.0	T	E

Transformers 5 MVA and larger also accepted as load tap changing transformers using ABB Types UTS-A and UTT-B load tap changers.

<u>Uptegraff</u>	34.4	T	E
	43.8	T	E

<u>Virginia Transformer</u>	67.0	-	E
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Transformers 5 MVA and larger also accepted as load tap changing transformers using ABB type UZE and Reinhausen type RMV-2 tap changers

All acceptances are based on RUS Specification S-3: Specifications for Step-Down Distribution Substation Transformers, and 15 kV or 25 kV class secondary voltages.

115 kV and 138 kV transformers may have one step reduced BIL.

an - Transformers, Step Ratio, Single Phase,
Autotransformers or Two-Winding Transformers
for Use in System Voltage Conversion

Condition of Acceptance: To obtain experience.

<u>Manufacturer</u>	<u>Designation</u>	<u>Size</u>
<u>ABB</u>		
2-WND	"Jumbo"	167-500
<u>Central Moloney</u>		
2-WND	AOD	167-500
<u>Cooper Power Systems</u>		
2-WND	"Round-Coil"	167-500
AUTO	MEPS-AUTO	167-1000
<u>Delta Star</u>		
2-WND	LTD	167-500
AUTO	LTD-A	167-1000
<u>General Electric</u>		
2-WND	HS STEP	167-500
AUTO	HS STEP	167-1000
<u>Howard Industries</u>		
2-WND	STEPS	167-500

NOTE: Two-winding transformers are self-protected under external short circuit in accordance with ANSI C57.12.90A. Auto-transformers will withstand 25 times rated current under external short circuit in accordance with ANSI C57.12.90A.

ao - Bolt, strand eye, straight (thimble eye)

Applicable Specification: ANSI C135.4, "Standards for
Galvanized Ferrous Eye Bolts and
Nuts for Overhead Line
Construction."

Applicable Sizes: 5/8 inch, 6 through 12 inch length 3/4
inch, 8 through 12 inch length

The following manufacturers have shown compliance with the applicable specification:

Dixie Electrical Manufacturing Company
Hubbell (Chance)
Joslyn Manufacturing Company
Kortick Manufacturing Company
MacLean (Continental)

*"Static proof" designs available.

ap-1
July 2002

ap - Clamp, hot line
Copper and Copperweld-copper Conductor
(Clamps with internal springs and enclosed threads)

Conductor	
Copper	6 thru 2/0
Copperweld-copper	8A thru 2A
Blackburn	HLC 2108
Hubbell (Anderson)	BC-2/0
Hubbell (Chance)	S1520CC
Hubbell (Fargo)	GH-100S
	GH-201 (For use with CL Fuse)
Ideal	3532
MacLean (Reliable)	C1520
Penn-Union	HLC-020-LS

ap - Clamp, hot line
ACSR with armor rods

Clamps listed below have spring action and enclosed thread chambers.

Conductor Size		4/0 & 3/0	2/0	1/0 & 2	4
	Tap Conductor				
Connector Mfg.	Aluminum	HL 4/0	-	-	-
Hubbell (Anderson)	Aluminum Copper	AC-800 AC-800-GP	AH-4 AH-4-GP	AH-4 AH-4-GP	AH-4 AH-4-GP
Hubbell (Chance)	Aluminum Copper	S1540-AA S1540-AC	S1540-AA S1540-AC	S1530-AA S1530-AC	S1530-AA S1530-AC
Hubbell (Fargo)	Aluminum Copper	GH-202AL GH-102AC	GH-202AL GH-102AC	GH-101A GH-101AC	GH-101A GH-101AC
MacLean (Reliable)	Aluminum Copper	-	-	C1530A C1530A	C1530A C1530A
Penn Union	Aluminum Copper	- -	- -	HLCA-040 HLCA-040	HLCA-040 HLCA-040
Utilco	Aluminum	-	HLC-397	-	HLC-40

ar - Wireholder

Applicable Specification: "RUS Specification for Service Wireholders," D-15

	<u>With #22 Wood Screw</u>
Blackburn	SW3
Dixie	D3-11-44
Hubbell (Chance)	3-11-44
Porcelain Products	1986

NOTE: For triplex type service cable see clevis type wireholders on page bt-1.

Conditional List
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ar - Wireholder
(with #22 wood screw)

Manufacturer	Conditions
<u>Joslyn</u> J089Z (nylon alloy)	To obtain experience.
<u>Hubbell Power Systems (Chance)</u> C207-0138 (nylon alloy)	To obtain experience.

ar - Wireholder

Applicable Specification: "RUS Specification for Service Wireholders," D-15

	<u>With #22 Wood Screw</u>
Blackburn	SW3
Dixie	D3-11-44
Hubbell (Chance)	3-11-44
Porcelain Products	1986

NOTE: For triplex type service cable see clevis type wireholders on page bt-1.

as - Clevis, service swinging

Applicable Specifications: "RUS Specifications for Service Swinging Clevises," D-7

	<u>Clevis Only*</u>	<u>Clevis with Wet Process Spool</u>	<u>Clevis with Dry Process Spool</u>
Dixie	D1938	D1938-C	D1948-C
Hubbell (Chance)	1948C	1948C-C909-1031	1948C-0606
Joslyn	J1614	-	-
Kortick	K9260	K9141	K9142
MacLean (Continental)	U32003	U31003	U31004

*Catalog number does not include spool; for spool insulators see Item cm.

at - Guy Marker
8 Foot Length
Plastic or Fiberglass

Manufacturer	Catalog Number
Auburn Extrusions	TK-808 (Yellow) (with bolt type clamp)
Custom Plastics	CPI-100XX-PVC Series
Dulmison	HGG-OL8Y-C (Yellow)*
Electrical Materials	70-7 tie G (Gray)* 70-7 tie Y (Yellow)* 70-7 tie O (Orange)* 70-7 tie YORS (Yellow with Orange Stripes)*
Hubbell (Chance)	96-PBG-2 (Gray) 96-PBG-2Y (Yellow) 96-PBG-2ORG (Orange) 96-FRPMR-GRY (Gray)* 96-FRPMR-YEL (Yellow)* 96-FRPMR-ORG (Orange)* 96-FRPMR-GRN (Green)*
Joslyn	J1491Y (Yellow) J1491G (Gray) J5518 (Yellow)*
Mangrum	R-8-Y
Osmose	OZ-25-18R (Yellow)
Preformed Line Products	PG-5508 (Gray)* PG-5518 (Yellow)*
Radar	6032B (Yellow)*
Vaughn	003-7I40 (Gray)* 004-7I40 (Yellow)* 005-7I40 (White)*
Virginia Plastics	TG-137-8G (Gray)* TG-137-8Y (Yellow)* FG-8G (Gray)** FG-8Y (Yellow)**

* For use with formed or automatic type deadends for guy strand; will not fit over bolt type guy clamps.

** Available with either 1 or 2 bolt clamps.

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at - Guy Marker
(Non-Flame Retardant)
8 Foot Length
Plastic or Fiberglass

Manufacturer	Catalog Number
Custom Plastics	CPI-100XX-PVC Series
Joslyn	J5718 (Yellow)* J1493Y (Yellow)
L. F. Manufacturing	MS-8-Y
Petroflex	P100-SDR17 Series
Preformed Line Products	PG (Poly) Series
R&M Plastics	GGY-TU-8 RMY GG-SM-8*
Radar Engineers	6034 and 6036
Virginia Plastics	TGP-16 PF

*For use with formed or automatic type deadends for guy strand; will not fit over bolt type guy clamps.

at - Reflective Guy Marker, 8-foot length

Plastic or Fiberglass

Manufacturer	Conditions
* <u>Nordic</u> HG-815 yellow	To obtain experience.

*For use with formed or automatic type deadends for guy strand; will not fit over bolt type guy clamps.

av - Conductor, ACSR

Applicable Specification: ASTM Specification B 232

Preferred Sizes:

<u>Distribution</u>	<u>Transmission</u>
4 - 6/1	1/0 - 6/1
4 - 7/1	2/0 - 6/1
2 - 6/1	3/0 - 6/1
2 - 7/1	4/0 - 6/1
1/0 - 6/1	266.8 kcmil - 26/7
2/0 - 6/1	336.4 kcmil - 26/7
3/0 - 6/1	477 kcmil - 26/7
4/0 - 6/1	556.5 kcmil - 26/7
266.8 kcmil 18/1	795 kcmil - 26/7
336.4 kcmil 18/1	954 kcmil - 54/7
477 kcmil 18/1	

NOTE: Larger sizes may be used where the engineer's study shows they are required.

The following manufacturers have shown compliance with the applicable specifications:

Alcan Cable
Conductores Monterrey S.A. de C.V.
Condumex
General Cable
Nehring
Nexans Canada
Noranda
Pirelli Cable
Southwire
Taihan Electric Wire

NOTES

1. Conductors with 18/1 stranding have different sag characteristics than conductors with 6/1 or 26/7 stranding. This difference in sag characteristics must be taken into consideration in the line design.
2. 266.8 kcmil 26/7, 336.4 kcmil 26/7, and 477 kcmil 26/7 may be used for distribution underbuild on transmission lines.

av - Conductor, copper

Applicable Specifications: ASTM Specification B1 for hard-drawn solid
ASTM Specification B8 for hard drawn stranded and soft stranded
ASTM Specification B3 for soft or annealed solid.

Preferred Sizes: Hard-drawn solid - 4 and 6
Soft or annealed solid - 4 and 6
Hard-drawn stranded - 2x3, 1/0 x 7, 2/0 x 7
Soft stranded - 4 and 6

The following manufacturers have shown compliance with the applicable specifications:

Conductores Monterrey S.A. de C.V.

Condumex

General Cable

Hickory Wire, Inc.

Nehring

Republic Wire

Rome Cable

Seal Wire Company

Service Wire Company

Southwire

av - Conductor, Copper and Copper-clad steel

Applicable Specification: ASTM Specification B 229

<u>Preferred Sizes</u>	
<u>Distribution</u>	<u>Transmission</u>
8A	1/0 F
6A	2/0 F
4A	3/0 F
2A	4/0 F

The following manufacturers have shown compliance with the applicable specification for the sizes indicated:

Copperweld Southern
Southwire

(All sizes)
(2A and smaller)

av - Conductor, Service
(Single Conductor)

Manufacturer	Aluminum	Copper
Alcan Cable	x	-
Conductores Monterrey	x	-
Condumex	x	x
General Cable	x	x
Nehring	x	-
Nexans Canada	x	-
Pirelli Cable	x	x
Rome Cable	x	x
Southwire	x	x

Applicable Specification: ICEA-NEMA Standard S-66-524

Insulation: Cross-linked thermosetting polyethylene or equal.

Conductor: MHD copper or HD (Aluminum 1350) aluminum (Compact or compressed stranded conductor is acceptable.)

Marking: Manufacturer's name and type of insulation shall be clearly shown in durable markings on the surface of the insulation at intervals no greater than 24 inches.

av - Conductor, Service Cable
(Triplex and Quadruplex)

<u>Manufacturer</u>	<u>Aluminum</u>	<u>Copper</u>
Alcan Cable	x	-
Conductores Monterrey	x	-
Condumex	x	x
General Cable	x	x
Hendrix	x	x
Nehring	x	-
Nexans Canada	x	-
Pirelli Cable	x	x
Rome Cable	x	x
Southwire	x	x

Applicable Specifications: RUS Specification D-2, Specifications for 600 Volt Neutral-Supported Secondary Service Drop Cables.

av - Conductor, Aluminum Alloy

Applicable Specification: ASTM Specification B399

Preferred Sizes:

DISTRIBUTION		TRANSMISSION	
6201	ACSR Equiv.	6201	ACSR Equiv.
48,690 cmil - 7 str.*	4	123,300 cmil - 7 str.**	1/0
77,470 cmil - 7 str.*	2	155,400 cmil - 7 str.**	2/0
123,300 cmil - 7 str.	1/0	195,700 cmil - 7 str.**	3/0
155,400 cmil - 7 str.	2/0	246,900 cmil - 7 str.	4/0
195,700 cmil - 7 str.	3/0	312,800 cmil - 19 str.	266,800 cmil
246,900 cmil - 7 str.	4/0	394,500 cmil - 19 str.	336,400 cmil
		559,500 cmil - 19 str.	477,000 cmil
		652,400 cmil - 19 str.	556,500 cmil
		927,200 cmil - 37 str.	795,000 cmil

*Not recommended for multiphase lines with span lengths exceeding 300 ft.

**Not recommended for suspension type construction.

The following manufacturers have shown compliance with the applicable specifications:

<u>Manufacturer</u>	<u>Type</u>
Alcan	6201
General Cable	6201
Southwire	6201

Conditional List
av(1)
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av - conductor

Manufacturer	Conditions
<u>Alcan Cable</u> Duplex type, with ACSR or AAAC (6201) conductors using preferred conductor sizes.	1. To obtain experience. 2. Conductor handling and installation shall be in accordance with manufacturer's recommendations.
<u>Copperweld Southern</u> Alumoweld-aluminum 6/1 ACSR/AW, 2, 1/0, 2/0, 4/0 4/3 AWAC, 4, 2, 1/0	To obtain experience.
<u>General Cable</u> T-2 type, with ACSR or AAAC (6201) conductors using preferred conductor sizes.	1. To obtain experience. 2. Conductor handling and installation shall be in accordance with manufacturer's recommendations.

aw - Washer, Spring

1/4" x 1-3/4" x 3-1/2"

Manufacturer	Bolt Size		
	5/8"	3/4"	7/8"
Hubbell (Chance)	3540	3541	--
Joslyn	J3540	J3541	J3542
Kortick	K2909	--	--
Line Hardware	SCW-58	SCW-34	SCW-78

ax - Cutout and Arrester, Combination

Nominal System Voltage		<u>For 12.5Y/7.2 kV</u>		<u>For 13.2Y/7.6 kV</u>		<u>For 24.9Y/14.4 kV</u>	
Cutout Max. Voltage Rating		<u>7.8 kV</u>		<u>15 kV</u>	<u>15 kV</u>	<u>18 kV</u>	<u>27 kV</u>
Application		1ø Trans.	1ø Sect.	3ø Bank 3ø Sect.	1ø Trans.	1ø Trans.	3ø Bank 3ø Sect.
Cutout Current Rating		<u>50*</u>	<u>100</u>	<u>100</u>	<u>50*</u>	<u>100</u>	<u>50*</u>
Manufacturer	Type Mounting	Catalog Numbers					
ABB	Crossarm Crossarm (L)		7.8 NCX/9 LVG 7.8 LBU-II/9 LVG	15 NCX/10 LVG 15 LBU-II/10 LVG		15 NCX/10 LVG 15 LBU-II/10 LVG	24.9 NCX/18 LVG 24.9 LBU-II/18 LVG
Cooper	Crossarm (L) Transformer Crossarm	AFZS110M010	AFZS510B Series L4A1P1A00-BDOA	AFZS510C Series L4A1P1A00-BDOA	AFZS110M010	AFZS510C Series L4A1P1A00-BDOA	AFZS518D Series L9CAP1A00-BGOA
Hubbell (Chance)	Crossarm Transformer		C7 Series	C7 Series		C7 Series	C7 Series
Kearney/Cooper Power Systems	Crossarm Transformer			KE3AB110E-110		KE4AB110E-110	KE7BD109E-110
		294072			294073		294074

Either normal duty or heavy duty distribution class arresters listed on page ae-1 are acceptable for use with these combination units.

*These cutouts have open links and must not be used where fault currents are high or for sectionalizing.

(L) Indicates loadbreak type is available.

az - Pole Numbers and Letters, Metal

(See Drawing M52-3)

Manufacturer	Catalog No.
Almetek Industries, Inc.	"E-Z Tags" - Order by description
Premax Products	1523
Tech Products	Everlast Tag

ba - Bolt, Angle Eye

Thimble Type

Applicable Specification: ANSI C135.4, "Standards for Galvanized Ferrous Eye Bolts and Nuts for Overhead Line Construction."

Applicable Sizes : 5/8 inch, 6 through 12 inch length
3/4 inch, 8 through 12 inch length

The following manufacturers have shown compliance with the applicable specifications:

Dixie Electrical Manufacturing Company
Hubbell (Chance)
Joslyn Mfg. and Supply Company
Kortick Manufacturing Company
MacLean (Continental)

*"Static proof" designs available.

bb - Brace, sidearm vertical

	<u>26" brace 24" bolt-hole spacing</u>	<u>50" brace 24" bolt-hole spacing</u>
Dixie	D6986	D6987
Kortick	K1931	K1932
MacLean (Continental)	U5249	U5250

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be - Reclosers, oil and vacuum

Mfr	Phases	Type	Circuit Voltage	Continuous Rating	Int. Rating	Oil/ Vacuum	Hydraulic/ Electronic
Cooper	1	H	12.5/7.2	5-50	1250	O	H
	1	4H	12.5/7.2	5-100	2000	O	H
	1	L	12.5/7.2	25-100	4000	O	H
	3	6H	12.5/7.2	5-100	2000	O	H
	3	W	12.5/7.2	100-560	10,000	O	H
	3	WE	12.5/7.2	560	10,000	O	H
	3	VSA-12	12.5/7.2	100-560	12,000	V	E
	1	E	24.9/14.4	5-100	2500	O	H
	(Type E available with shunt lockout solenoid for three-phase operation)						
	1	4E	24.9/14.4	50-200	4000	O	H
Lexington Switch and Controls	3	WV	34.5/19.9	560	8000	O	H
	3	WVE	34.5/19.9	560	8000	O	E
	1	A Line Model B	12.5/7.2	5-50	1250	O	H
	1	A Line Model D	12.5/7.2	25-100	2000	O	H
	1	A Line Model K	12.5/7.2	25-100	4000	O	H

NOTES:

1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Recloser, oil circuit
12.5/7.2 kV

Manufacturer	Conditions
<u>ABB</u>	
Three phase oil circuit recloser (Shunt trip with static or relay type controls)	
Type ES-400 (15-400 amperes)	To obtain experience.
Type ES-560 (15-560 amperes)	
Type ESM-560 (100-560 amperes)	
Type ES-105 (15-560 amperes)	
<u>Cooper Power Systems</u>	
Single phase, Type D rated 100 amperes continuous, 10,000 amperes symmetrical	To obtain experience.
<u>Lexington Switch and Controls</u>	
Three phase oil circuit recloser, 50,100 and 280 ampere frames.	To obtain experience.
A Line, Model 3B (5-50 amperes)	
Model 3D (5-100 amperes)	
Model 3K (25-280 amperes)	

24.9/14.4 kV

<u>Lexington Switch and Controls</u>	
Oil circuit recloser,	
Single phase-A Line, Model M rated 100 amperes	To obtain experience.
Three phase-A Line, Model 3M rated 100 amperes	

34.5/19.9 kV

<u>Cooper Power Systems</u>	
Single phase, Type DV rated 100-280 amperes continuous, 8,000 amperes symmetrical	
	To obtain experience.

NOTES:

1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Reclosers, vacuum interrupter

Manufacturer	Conditions
<u>ABB</u>	
Three phase Type ESVA rated 560/800 amps continuous, 12,000 amps symmetrical, maximum voltage 15.5 kV for 12.5/7.2 kV	To obtain experience.
Three phase Type ESMVA rated 560 amps continuous, 16,000 amps symmetrical, maximum voltage 15.5 kV for 12.5/7.2 kV	To obtain experience.
Three phase Type ESV rated 800 amps continuous, maximum voltage 38 kV 24.9/14.4 kV	To obtain experience.
<u>Cooper Power Systems</u>	
Single phase, Type V4H rated 5-100 amperes continuous, 2,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	To obtain experience.
Single phase, Type V4L rated 50-100 amperes continuous, 6,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	To obtain experience.
Three phase, Type V6H rated 5-100 amperes continuous, 2,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	To obtain experience.

NOTES:

1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Recloser vacuum interrupter

Manufacturer	Conditions
<u>Cooper Power Systems</u>	
Three phase, Type VW rated 560 amperes continuous, 2,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	To obtain experience.
Three phase, Type VWE rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	To obtain experience.
Three phase, Type VSA-16 rated 560 amperes continuous, 16,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	To obtain experience.
Three phase, Type VWV27 rated 560 amperes continuous 12,000 amperes symmetrical, maximum voltage 27 kV for 24.9/14.4 kV	To obtain experience.
Three phase, Type VWVE27 rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 27 kV for 24.9/14.4 kV	To obtain experience.
Three phase, Type VWV38 rated 50-560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 38 kV for 34.5/19.9 kV	To obtain experience.

NOTES:

1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Recloser, vacuum interrupter

Manufacturer	Conditions
<u>Cooper Power Systems</u>	
Three phase, Type VWVE38 rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 38 kV for 34.5/19.9 kV	To obtain experience.
Three phase, Type VSO-12 rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 38 kV for 34.5/19.9 kV	To obtain experience.
Three phase, Type VSO-16 rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 38 kV for 34.5/19.9 kV	To obtain experience.
Single phase, type VXE electronically controlled, vacuum interrupting, rated 10-200 amps continuous, 8000 amperes symmetrical, maximum voltage of 15.5 kV for 12.5/7.2 kV & 27 kV for 24.9/14.4 kV systems	To obtain experience.
<u>Engineering & Equipment de Mexico</u>	
Three phase, type, EEVW15, rated 25 to 560 amp continuous, 12000 amp interrupting, maximum voltage 15.5 kV for 12.4/7.2 kV.	To obtain experience.
<u>Joslyn</u>	
Three phase, Type JVR, SF6 insulation, rated 400 amps continuous, 6,000 amperes symmetrical, maximum voltage 15 kV for 12.5/7.2 kV	To obtain experience.
<u>Lexington Switch</u>	
Single phase, type EV627 rated 400 amp continuous, 6000 amp interrupting, maximum voltage 27 kV for 24.9/14.4 kV	To obtain experience.
Single phase, type EV815 rated 400 amp continuous, 8000 amp continuous, maximum voltage 15.5 kV for 12.9/14.4 kV	To obtain experience.

NOTES:

1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Recloser, vacuum interrupter

Manufacturer	Conditions
<u>Whipp & Bourne</u> Three-phase, Type GVR, SF6 insulation with vacuum interruption, 560 amps maximum continuous, 12000 amps RMS symmetrical interruption for 15.5 kV and 27 kV, 8000 amps RMS symmetrical for 38 kV. 15.5 kV maximum voltage for 12.5/7.2 kV, 27 kV maximum voltage for 24.9/14.4 kV, 38 kV maximum voltage for 34.5/19.9 kV.	To obtain experience.

NOTES:

1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Recloser, SF6 interrupter

Manufacturer	Conditions
<u>Hawker Siddeley</u> Type PMR-3/15 rated at 560 amperes continuous, 12,000 amperes symmetrical maximum, 15.5 kV Type PMR-3/27 rated at 560 amperes continuous, 12,000 amperes symmetrical maximum, 24.9 kV	To obtain experience.

NOTES:

1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Recloser, vacuum interruption with solid dielectric

Manufacturer	Conditions
<u>ABB</u> Three phase, Type VR-3S electronically controlled, vacuum interruption, solid dielectric, 560 amps maximum continuous, 12000 amps RMS symmetrical interruption, 15.5 kV maximum for 12.5/7.2 kV, 27 kV maximum for 24.9/14.4 kV.	To obtain experience
<u>Cooper Power Systems</u> Three phase, Type NOVA electronically controlled, vacuum interruption, solid dielectric, 560 amps maximum continuous, 12000 amps RMS symmetrical interruption, 15.5 kV maximum for 12.5/7.2 kV, 27 kV maximum for 24.9/14.4 kV.	To obtain experience
Single Phase, Type NOVA electronically controlled, vacuum interruption, solid dielectric, 400 amps maximum continuous, 8000 amps RMS symmetrical interruption, or 800 amps maximum continuous, 12500 amps RMS symmetrical interruption 15.5 kV maximum for 12.5/7.2 kV, 29.2 kV maximum for 24.9/14.4 kV.	To obtain experience
Three phase, Type NOVA-TS Triple-Single electronically controlled, vacuum interruption, solid dielectric, 400 amps maximum continuous, 12500 amps RMS symmetrical interruption, 15.5 kV maximum for 12.5/7.2 kV, 29.2 kV maximum for 24.9/14.4 kV.	To obtain experience
<u>Joslyn Hi-Voltage</u> Three-phase, Type TRIMOD 300 series, vacuum interruption, solid dielectric foam, 560 amps maximum continuous, 12000 amps RMS symmetrical interruption, 15.5 kV maximum for 12.5/7.2 kV, 27 kV maximum for 24.9/14.4 kV	To obtain experience
Single-phase, Type TRIMOD 100 series, vacuum interruption, solid dielectric foam, 560 amps maximum continuous, 12500 amps RMS symmetrical interruption, 17.1 kV maximum for 12.5/7.2 kV, 29.3 kV maximum for 24.9/14.4 kV	To obtain experience

NOTES:

1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.

2. Reclosers are not acceptable with load current, bushing CT battery chargers.

bh - Clevis, Service Deadend

Applicable Specification: "RUS Specification for Service Deadend Clevises," D-8

Manufacturer	Clevis Only*	Clevis with dry process spool	Clevis with wet process spool
Dixie	D0341	D0341-D	D0341-W
Hubbell (Chance)	0341	0341-0606	0341-C909-1931
Joslyn	J0313	-	-
Kortick	K9250	K9100	K9099
MacLean (Continental)	U32136	U31136	U36136

*Catalog number does not include spool; for spool see Page cm.

bi - Gain, Pole

For use with rectangular crossarms

Joslyn (Flagg)	PX252
Hubbell (Chance)	4092
MacLean (Continental)	CAG-44-5

For braceless crossarms (narrow profile construction)

Joslyn (Flagg)	PX182A
MacLean (Bethea)	GCAF-6A
MacLean (Continental)	DEA-65-10A

Transmission

Grid Gains

	Sizes in inches	
	<u>4" x 4"</u>	<u>4" x 9"</u>
Hubbell (Chance)	PG44	PG945
Hughes Brothers	I263	I260
Joslyn (Flagg)	PX122	PX260
MacLean (Bethea)	GSF-44-7	GSFT-95-7
MacLean (Continental)	GGSF-4040-7	GRF-9045-7

bj-1
July 2002

bj - Guy Hook

Applicable Specification: Edison Electric Institute Specification TD-11- 1951, "Specifications for Guy Hooks and Guy Strain Plates."

Dixie	D6584
Hubbell (Chance)	6584
Joslyn	J1019
Kortick	K4031
MacLean (Continental)	U5310

bk - Guy Plate

Applicable Specifications:

Strain Type: Edison Electric Institute Specification TD-11 1951, "Specifications for Guy Hooks and Guy Strain Plates."

Lift Type: None

	Strain Type 4" x 8" x 14 gage	Lift Type 2-1/2" x 7" x 1/4", 2 hole
Dixie	D6575	D7888
Hubbell (Chance)	6575	7898
Joslyn	J1034	-
Kortick	K4015	K3511
Line Hardware	GSP-1	-
MacLean (Continental)	U5351	UC434

bn-1
July 2002

bn - clamp, loop deadend

For ACSR

	<u>3/0</u>	<u>2/0</u>	<u>1/0</u>	<u>2</u>	<u>4</u>
ALCOA	-	413	413	412	411
Blackburn	DLC23	DLC2106	DLC2106	DLC2106	DLC2106
Burndy	-	-	UW25R	UW2R	UW2R
C & R	-	-	CRLD-10	CRLD-10	CRLD-10
Hubbell (Anderson)	LC-74B	LC-71B	LC-70B1	LC-70B	LC-70B
Hubbell (Fargo)	GA-145	GA-145	GA-144	GA-144	GA-144
MacLean (Bethea)	ALD-7373-U	ALD-34-U	ALD-1313-U	ALD-1313-U	ALD-1313-U

bo - Shackle, anchor

Distribution

20,000 lbs.
5/8" Pin

Dixie	D5801
Hubbell (Anderson)	AS-25
Hubbell (Chance)	5801
Joslyn	J2742
Kortick	K4481
Lapp	33852
Lindsey	3260
Line Hardware	AS-1
MacLean (Bethea)	ASH-45
Sur-Loc, Inc.	5500

Transmission

	<u>30,000 lbs.</u> <u>3/4" bolt</u>	<u>50,000 lbs.</u> <u>7/8" bolt</u>
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Joslyn	BT3023BNK	BT3036BNK
MacLean (Bethea)	ASH-56-BC	ASH-67-BC

br-1
July 2002

br - Chain Link (End Link)

<u>Manufacturer</u>	<u>Catalog Number</u>
Joslyn	BT-3082
Lapp	6415-HT
Lindsey	3403
MacLean (Bethea)	CL-5

bs - Bolt, single upset

Applicable Specifications: "RUS Specifications for Single and Double Upset Spool Bolts," D-5

Diameter, inches	5/8	5/8	5/8	5/8
Length, inches	7	8	9	10
Dixie	D7740	D7741	D7741-1/2	D7742
Hubbell (Chance)	-	7741	7741-1/2	7742
Joslyn	-	J2342-1/2	J2343-1/2	J2344-1/2
Kortick	K4929	K4950	K4930	K4951
MacLean (Continental)	U3105-1/2	U31053	U31053A	U31054

*"Static proof" designs available.

bt-1
January 2003

bt - Wireholder, clevis type
with No. 24 wood screw

(For use with triplex type service cable, Drawing K10C-A)

Dixie	D075*
Hubbell (Chance)	0192*
Joslyn	J075*

*Catalog number does not include insulator. Use secondary type spool insulator with 1-3/4 inch groove diameter. See page cm-1.

bu - Connector, grounding
for transformer or other equipment

Manufacturer	Copper Alloy ¹	Plated Copper Alloy ²	Aluminum Alloy ³
Blackburn	TTC-4	TTC2P	-
Burndy	EQC632C	EQC632C-TN	-
Dossert	TGCL8-50	TGCL8-50-SN	-
Hubbell (Anderson)	GTCL-23A	GTCL-23A-TP	-
Hubbell (Fargo)	GC-207	GC-207P	GA-220
Line Hardware	TGL-110	TGL-110P	-
Maclean (Reliable)	BVC-207	-	-
Penn-Union	GSE-C1	GSE-C1TN	-
Tanner	-	GET-1-TN	-

1 - For use with copper type ground wire.

2 - For use with both copper and aluminum type ground wire.

3 - For use with aluminum type ground wire.

bv - Rods, armor

(includes standard, double insulator, and tapping rods)

Aluminum or aluminum alloy rods for use on ACSR

Alcoa	Formed Type
Dulmison	Formed Type
Florida Wire and Cable	Formed Type
Helical Line Products	Formed Type
Helix Uniformed Ltd.	Formed Type
Preformed Line Products	Formed Type

Copperweld rods for copper or CWC conductor

Dulmison	Formed Type
Helical Line Products	Formed Type
Preformed Line Products	Formed Type

Alumoweld rods for aluminum clad steel (Alumoweld)
overhead ground wire

Dulmison	Formed Type
Helical Line Products	Formed Type
Preformed Line Products	Formed Type

bx - Splice, automatic

<u>Copper</u>	<u>Hubbell (Fargo)</u>	<u>MacLean (Reliable)</u>
6	GL-111	61
4	GL-112	41
2 x 3	GL-115	-
1/10 x 7	GL-117	107
2/0 x 7	GL-118	207
3/0 x 7	GL-119	307
4/0 x 7	GL-120	407
 <u>CWC</u>		
8A	GL-112	-
6A	GL-113	47
4A	GL-115	27
2A	GL-117	-
 <u>ACSR</u>		
	GL-400A Series*	7650 Series*
<u>Aluminum Alloy (6201 and 5005)</u>	GL-400A Series	AL55 Series

*For use on conductors 4/0 and smaller only.

Conditional List
bx(1)
July 2002

bx - Splice, automatic

Manufacturer	Conditions
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DISTRIBUTION

Blackburn

#4, #2 ACSR or 6201 (ACSR equiv.) ATS42	1. To obtain experience.
1/0, 2/0 ACSR or 6201 (ACSR equiv.) ATS1020	2. For use on distribution systems only.
3/0, 4/0 ACSR or 6201 (ACSR equiv.) ATS3040	
266.8, 336.4 kcmil ACSR ATS266336	
477 kcmil ACSR ATS397477	

Hubbell (Fargo)

AWAC 4 - 4/3 GLA-105	Same as above.
AWAC 2 - 4/3 GLA-110	
AWAC 1/0 - 4/3 GLA-115	
266.8 kcmil ACSR 18/1 GL-410	Same as above.
336.4 kcmil ACSR 18/1 GL-411	
477 kcmil ACSR 18/1 GL-413	

MacLean (Reliable)

266.8 kcmil ACSR 18/1 7657	Same as above.
336.4 kcmil ACSR 18/1 7658	
477 kcmil ACSR 18/1 7659	

DISTRIBUTION AND TRANSMISSION

Hubbell (Fargo)

266.8 kcmil ACSR 26/7	To obtain experience.
336.4 kcmil ACSR 26/7	
477 kcmil ACSR 26/7	

by - Deadend, automatic and formed Type

<u>Conductor Size</u>			
<u>Cu</u>	<u>CWC</u>	<u>Hubbell (Fargo)</u>	<u>Maclean (Reliable)</u>
-	4A	GD-515	27-SDS
-	6A	GD-513	47-SDS
-	8A	GD-512	-
2 x 3	-	GD-515	271
4	-	GD-512	41LD
6	-	GD-511	61LD

ACSR

*Blackburn	ATD Series
*Dulmison	AWDG-0805, 0990, and 1135
*Hubbell (Fargo)	GD-400 Series
*MacLean (Reliable)	7650 Series
*Preformed	OG-9360 thru 9366
	#OHDE-9534 thru 9540, 4577

#May only be used with a spool insulator (Item cm) and appropriate clevis for neutral and secondary applications.

*For use on conductors 4/0 and smaller only.

Aluminum Alloy (6201 and 5005)

Blackburn	ATD Series
Hubbell (Fargo)	GD-A Series
MacLean (Reliable)	AL Series
Preformed	OG-9360 thru 9366

by - Deadends, automatic and formed type

FORMED TYPE

<u>Manufacturer</u>	<u>Conditions</u>
<u>Preformed Line Products</u>	
AWAC 4 - 4/3 DG-4560	To obtain experience.
AWAC 2 - 4/3 DG-4562	
AWAC 1/0 - 4/3 DG-4565	

AUTOMATIC TYPE

<u>Hubbell (Fargo)</u>	
AWAC 4 - 4/3 GDA-235	To obtain experience.
AWAC 2 - 4/3 GDA-240	
AWAC 1/0 - 4/3 GDA-245	
266.8 kcmil ACSR 18/1 GD-53I5A	1. To obtain experience.
336.4 kcmil ACSR 18/1 GD-53I5A	2. For use on distribution lines only.
477 kcmil ACSR 18/1 GD-5325A	
<u>MacLean (Reliable)</u>	
AWAC 4 - 4/3 5201	To obtain experience.
AWAC 2 - 4/3 5202	
AWAC 1/0 - 4/3 5204	
226.8 kcmil ACSR 18/1 7657 SDS	1. To obtain experience.
335.4 kcmil ACSR 18/1 7658 SDS	2. For use on distribution lines only.
477 kcmil ACSR 18/1 7659 SDS	

bz - Switch, oil

12.5/7.2 kV

	Type	Description
ABB	CSL**	Single-phase, manual and remote manual or elec. control, 200 amp. Three-phase, remote manual or elec. control, 200 amp.
Cooper Power Systems	NR*	Single-phase, remote elec. control, 200 amp.
	VR*	Three-phase, remote elec. control, 400 amp.
General Electric	FKC-2	Single and three-phase, manual, 200 amp.
	FKC-2*	Single and three-phase, remote control, 200 amp.

*Control equipment should be selected in accordance with the requirements of individual installations.

**This item is also available in a special design for use in areas where corrosion is a serious problem.

Conditional List
bz(1)
July 2002

bz - Switch, oil

Manufacturer	Conditions
<u>Cooper Power Systems</u> Capacitor oil switch Type TSC, 38 kV max. 100 ampere capacitor switch, 300 ampere load switch	To obtain experience.
Oil switch with 125 kV BIL accessory Type NR, 15 kV, single- phase, remote electric control, 200 amp. at 75 to 100 percent power factor	1. To obtain experience. 2. For use on single- phase taps of 24.9/14.4 kV multi- grounded wye systems.
<u>Trinetics</u> Capacitor, oil switch Type CSD-95, 95 kV BIL 15 kV Max. 200amp.	To obtain experience.
Oil switch with 125 kV BIL accessory, CSD-125, 15 kV, single-phase, 200 amp	1. To obtain experience. 2. For use on single-phase taps of 24.9/14.4 kV multi-grounded wye systems.

bz - Switch, vacuum
(For capacitor switching)

Manufacturer	Conditions
<u>Joslyn</u> Capacitor vacuum switch, VerSaVac, 200 Amp, 95 or 125 kV BIL, single-phase or three-phase for use on 15 kV systems	<ol style="list-style-type: none">1. To obtain experience.2. Single-phase switch rated 125 kV BIL may be used on single- phase taps of 24.9/14.4 kV multi-grounded wye systems.3. Three-phase switch requires special mounting bracket.

cg - Switch, air, three-pole, group-operated
NEMA standard switches for station and line structures

Manufacturer	Acceptable Mounting on Structures	Tilting Ins.		Vertical Break		Side Break		Center Break		Double Break	
		Type	kV	Type	kV	Type	kV	Type	kV	Type	kV
ABB	Horizontal			TTR6	345						
	Horizontal			TTR8	15-230						
G & W Electric Co.	Horizontal			MK-40	15-69	PMB-40A	15-69	LPC	69-230		
	Horizontal			D6(L)	15-34.5						
Hubbell (Chance)	Phase over Phase			D6(L)	15-34.5						
	Vertical			D6(L)	15-34.5						
Johnson	Horizontal			VIP	15-230	LS	15-69	M	15-230		
	Horizontal			RF-2(VL)	15-230	RB-1(VL)	15-25				
Joslyn (Hi-Voltage)	Horizontal					RB-1*	15-115				
Kearney/Cooper Power Systems	Horizontal	AR 60-P	15-69								
	Horizontal										
MEMCO	Horizontal	AgF	15-69	EA	15-345			EE	69-230		
	Horizontal	AgC	15-69			RI4-C	15-46				
MORPAC (Morgan)	Horizontal			VBV (VL)	15-230			CBV	15-230		
	Vertical			VBV (VL)	15-230			CBV	15-230		
Royal Switchgear	Phase over Phase							CBV	15-25		
	Horizontal							V	15-230		
	Phase over Phase							V	15-23		

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

*These switches may be purchased with reduced voltage vacuum interrupters and may be applied for loop sectionalizing duty when peak recovery voltage does not exceed 25 kV

NOTE: Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

cg - Switch, air, three-pole, group-operated
NEMA standard switches for station and line structures

Manufacturer	Acceptable Mounting on Structures	Tilting Ins.		Vertical Break		Side Break		Center Break		Double Break	
		Type	kV	Type	kV	Type	kV	Type	kV	Type	kV
S & C***	Horizontal Phase over Phase Vertical			Alduti(L)	15-34.5	Alduti(L)	15-25			Alduti(L)	34.5-46
				Alduti(L)	15-25	Alduti(L)	15-25			Alduti(L)	34.5-46
				Alduti(L)*	15-34.5	Alduti(L)	15-25			Alduti(L)*	34.5-46
SEECO	Phase over Phase			GOABS(VL) 15-69							
Siemens-Allis	Horizontal			AVB(VL)**	115-345			CB	115-230		
								CBL-2	115-230		
Southern States	Horizontal			EV	15-230						
Turner	Phase over Phase			TA(VL)	15-69	SSB-T (1D, 2D, 3D)(VL)	15-69 15-161 15-161	EC	115-230		
USCO	Horizontal Horizontal Phase over Phase			TH1(VL)	15-161						
	Horizontal Horizontal Phase over Phase			AVR(VL)**	15-230	ASB	35-138	AGCH **	15-345		
	Horizontal Horizontal Phase over Phase					ASB-II	15-25	AGCH-V** GCH	34.5-230 15-23		

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

*These switches, except 34.5 kV Alduti vertical break, are available and accepted with the S & C type SMD substation fuse cutouts listed on page af-3.

** Also available in bronze in some ratings.

*** Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

NOTE: Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

cg - Switch, air, three pole, group operated
(Factory Preassembled)
(FOR USE ON STEEL SUBSTATION STRUCTURES)

Manufacturer	Mounting	Vertical Type	kV	Side Break Type	kV
Hubbell (Chance)	Vertical	-		D7(L) 15-27	
	Horizontal	-		D7(L) 15-27	
S & C*	Phase-over-Phase	Alduti(L) 34.5 (200 kV BIL)		Alduti(L) 34.5 (200 kV BIL)	
	Vertical	Alduti (L) 34.5 (200 kV BIL)			

(L) Means gas or solid material full-load interrupters are accepted and available.

*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

cg - Switch, air, three-pole, group operated

(not Suitable for Substation Use)

<u>Manufacturer</u>	Acceptable Mounting	Vertical Break		Side Break		Center Break	
		Type	kV	Type	kV	Type	kV
Hubbell (Chance)	Horizontal			D6(L)	15-34.5		
	Phase over Phase Vertical	D7(L)	15-34.5	D6(L)	15-34.5		
Cooper Power Systems (Kearney)	Horizontal			M-FORCE(L)	15-35		
	Phase over Phase			M-FORCE(L)	15-35		
	Vertical			M-FORCE(L)	15-35		
Royal Switchgear	Horizontal					V	15-23
	Phase over Phase					V	15-23

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

NOTE: Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

cg - Switch, three-pole, group-operated
(Factory Preassembled)

Manufacturer	Acceptable Mounting on Structures	Vertical Break		Side Break	
		Type	kV	Type	kV
ABB	Horizontal (A)			SLB-3(L)	15-25
Bridges Electric [#]	Horizontal (A)			Vector(L)	15
	Phase over phase (A)			Vector(L)	15
	Vertical (A)			Vector(L)	15
[#] Only operating shaft version of switch accepted.					
Hubbell (Chance)	Horizontal (A)			D7(L)	15-27
	Phase over phase (A)			D7(L)	15-27
	Vertical (A)			D7(L)	15-27
	Horizontal (B)			D7(L)	34.5
	Phase over phase (B)			D7(L)	34.5
	Vertical (B)			D7(L)	34.5
Cooper Power Systems (Kearney)	Horizontal (A)			M-FORCE	15-35
	Phase over phase (A)			M-FORCE	15-35
	Vertical (A)			M-FORCE	15-35
Inertia Engineering	Horizontal (A)			LBS(L)	15-35
	Vertical (A)			LBS(L)	15-35
	Phase over phase (A)			LBS(L)	15-35
S&C*	Horizontal (A)			Alduti(L)	15-25
				Alduti(L)	34.5
				(200 kV BIL)	
	Phase over phase (A)			Alduti(L)	25
				Alduti(L)	34.5
				(200 kV BIL)	
	Vertical (A)			Alduti(L)	15-25
				Alduti(L)	34.5
				(200 kV BIL)	
	Phase over phase (B)		Alduti(L)34.5	Alduti(L)	34.5
	Vertical (B)		Alduti(L)34.5		

(L) Means gas or solid material full-load interrupters are accepted and available.

(A) Not suitable for substation use.

(B) For station and transmission use only. The steel crossarm base must be grounded with an adequate grounding connector. 200 kV BIL only.

NOTE: Switches with factory-assembled crossarm type bases for distribution lines must have non-conducting crossarm type bases, non-conducting braces, and insulated interphase and control rods, except as otherwise noted.

* Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

cg - Switch, air, three-pole, group operated

Manufacturer	Conditions
<u>Cleaveland/Price</u> Type V2-C (15-69 kV) Vertical break, horizontal or vertical mounting Type RL-C (15-69 kV) Single side break, horizontal or vertical mounting	1. To obtain experience. 2. Insulated interphase and control rods required on wood distribution structures.
<u>G & W Electric Company</u> Type MK-40A 15 kV through 345 kV(horizontal upright mounting)	1. To obtain experience. 2. Insulated interphase and control rods required on 15 kV and 23 kV models used on wood structures. 3. Steel interphase base required when mounted as in RUS Drawing TM-3.
Type LPV, 3-pole 72.5-272 kV, 1200 amp., 1600 amp., 2000 amp., center sidebreak for horizontal mounting.	To obtain experience.
<u>Hubbell (Chance)</u> Type AR Side-break, horizontal phase-over-phase, and vertical mounting, with non-conducting crossarm type base and insulated interphase and control rods, 15, 25 and 34.5 kV(grounded wye)	To obtain experience.

(L) Means full-load interrupter accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

cg - Switch, air, three-pole, group-operated

Manufacturer	Conditions
<u>PASCOR</u> VBP (15 - 230 kV) VBS (69 - 230 kV) Vertical break, vertical or horizontal mounting. Phase-over-Phase mounting(VBS, 69 - 115 kV only)	1. To obtain experience. 2. Insulated interphase and control rods required on wood distribution structures.
SB (15 - 69 kV) Side break, vertical or horizontal mounting.	1. To obtain experience. 2. Insulated interphase and control rods required on wood distribution structures.
CB (15 - 115 kV) Center break, vertical or horizontal mounting.	1. To obtain experience 2. Insulated interphase and control rods required on wood distribution structures.
	To obtain experience.
CBSA (69 - 138 kV) Center Break Vee, vertical, horizontal, or phase-over-phase mounting. (Also accepted as a copper switch at 69 - 115 kV.)	
<u>S & C*</u> Line-rupter with SF ₆ interrupter. Horizontal mounted 115-230 kV	To obtain experience.
Omni-Rupter (L) Side-break, horizontal phase-over-phase, and vertical mounting, with non-conducting crossarm type base and insulated interphase and control rods, 15 kV and 25 kV	To obtain experience.

(L) Means full-load interrupter accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

*Available with porcelain insulators. Available with "Cyproxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

cg - Switch, Air, Three-Pole, Group Operated

Manufacturer	Conditions
<u>SEECO</u> GOABS (VL) Vacuum interrupter type 115-169 kV	To obtain experience.
<u>Southern States</u> "Pole-Pak" 15-23 kV	To obtain experience.
Type ES; 15, 23 and 34.5 kV (horizontal upright models only)	<ol style="list-style-type: none"> 1. To obtain experience. 2. For 15 kV and 23 kV distribution lines, insulated interphase and control rod spacers required. See RUS Drawings M3-15 and VM3-16. 3. NEMA insulators and steel interphase base required for transmission line structure as in TM-3. 4. Acceptable on steel substations 15 through 34.5 kV with NEMA insulators and uninsulated interphase rods.
Type 57L sidebreak, 115-161 kV, 600 and 1200 amp., horizontal upright	To obtain experience.
Type CBL-T, 15-69 kV, 1200 amp (center break, horizontal upright mounting)	<ol style="list-style-type: none"> 1. To obtain experience. 2. Insulated interphase and control rods required on 15 kV and 25 kV models used on wood structures.
<u>Travis Switchgear</u> MA-32512, 25 kV, 150 kV BIL, vertical break	<ol style="list-style-type: none"> 1. To obtain experience. 2. Insulated interphase and control rods required when used on wood structures.

(L) Means full-load interrupter accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

ci-1
July 2002

ci - Clevis, thimble

Rated Strength

Manufacturer	20,000 lbs.	40,000 lbs.	50,000 lbs.
Joslyn (Flagg)	PA271	PA272B	-

cj - Pole Ground Wire

Soft annealed iron, BB Grade, class C galvanizing
(For pole protection only)

Size
1.15 Ohms/1000 ft., max.

Manufacturer

Florida Wire and Cable	3-wire, 5/16 inch
Indiana Steel and Wire	3-wire, 5/16 inch
National Strand Products	3-wire, 5/16 inch
Southwire	3-wire, 5/16 inch

Copper, soft annealed solid
ASTM Specification B3

Manufacturer
(See page av-2)

Aluminum (for above ground use only)
Hard-drawn

Manufacturer
(See page av-1)

Aluminum Alloy (for above ground use only)

<u>Manufacturer</u>	<u>Type</u>
Alcan Cable	6201
American Electrical	6201
Southwire	6201

Copper-Clad Steel, Annealed 40 percent Conductivity

<u>Manufacturer</u>	<u>Size</u>
Copperweld Southern*	No. 6

* Not for use on distribution when neutral is larger than #1/0 ACSR.

ck - clamp, anchor rod bonding

For Standard and Drive Type Rods

Diam. of Rod	Type of Eye	5/8"	3/4"	1"
C & R Products	Single	CRBC-1	CRBC-1	CRBC-1
	Twin	CRBC-2	CRBC-2	CRBC-2
	Triple	-	CRBC-3	CRBC-3
Dixie	Single	D3143	D3143	D3143
	Twin	-	D3144	D3144
	Triple	-	D3145	D3145
Hubbell (Chance)	Single	G5060	G5060	G5060
	Twin	G5061	G5061	G5061
	Triple	-	G5063	G5063
Joslyn	Single	3230	3230	3230
	Twin	3231	3231	3231
	Triple	-	3233	3233
Kortick	Single	K3147	K3147	-
	Twin	-	K3148	K3148
	Triple	-	K3149	K3149
Line Hardware	Single	RBC-100	RBC-100	RBC-100
	Twin	RBC-200	RBC-200	RBC-200
	Triple		RBC-300	RBC-300
MacLean (Continental)	Single	UCG5060	UCG5060	-
	Twin	-	UCG5061	UCG5061
	Triple	-	UCG5063	UCG5063

For Power Installed Screw Anchors

C & R Products	Single	CRBC-4	CRBC-5	-
Hubbell (Chance)	Single	G5067	G5068	-
Joslyn	Single	J26714	J26715	-
Line Hardware	Single	RBC-400	RBC-500	-

cm - Insulator, Spool

Type:	<u>Secondary (Wet Process)</u>		<u>Wet Process</u>	<u>Service</u> <u>Dry Process</u>
	<u>1-3/4"</u>	<u>3"</u>	<u>1-3/8"</u>	<u>1-3/8"</u>
Groove Diameter:	53-2	53-4	53-1	NA
ANSI Class				
Cooper Power Systems	DE4S3	DE5S3	DE2S2	DE2S1
Hughes	2102	-	-	-
Joslyn	-	J0101A	J150A	J100A
Kortick	K516	K522	K513	K514
Porcelain Products (Knox)	5101	5119	5107	5207
Universal	1082	-	-	-
MacLean (Continental)	U205	U31221	U208	U207
Victor Insulators, Inc.	2012	2026	2011	-

cp - Deadend, Compression Type

ACSR

Conductor Size	Alcoa	Burndy	
1/0	Order by Conductor Size and <u>Stranding</u>		Type Y-W
2/0			"
3/0			"
4/0			"
266.8 kcmil 18/1			
336.4 kcmil 18/1			
477 kcmil 18/1			
266.8 kcmil 26/7	2-piece alloy compression Type VES or HES "		Type Y-W
336.4 kcmil 26/7			Type YTW
477 kcmil 26/7			"
556.5 kcmil 26/7			"
795 kcmil 26/7			"
954 kcmil 54/7			"
Conductor Size	Hubbell (Anderson)	Hubbell (Fargo)	Kearney/Cooper Power Systems
1/0	VCD-50R	SEDA-8129	104000
2/0	thru	SEDA-7729	thru
3/0	VCD-61R	SEDA-7829	104000-03
4/0	"	SEDA-7929	"
266.8 kcmil 18/1	VCD-80-R		
336.8 kcmil 18/1	VCD-80-R		
477 kcmil 18/1	VCD-812-R		
266.8 kcmil 26/7	VCD-831-1-RM	Uni-Grip	104000-05
336.4 kcmil 26/7	VCD-831-1-RM	one die	thru
477 kcmil 26/7	VCD-832-2-RM	system	104000-14
556.5 kcmil 26/7	VCD-833-3-RM	Order by	"
795 kcmil 26/7	VCD-835-4RM	conductor size	
954 kcmil 54/7	VCD-835-4RM	and stranding	

NOTE: These compression deadends are acceptable when installed using tools and dies in accordance with the deadend manufacturer's recommendations.

cp - Deadend, Compression Type

ACSR
Adjustable

Hubbell (Fargo) Order by conductor size and stranding

Aluminum Alloy
(6201 and 5005)

Conductor Size: 4 thru 4/0

Hubbell (Anderson) Type VCD, Order by conductor size.

Copper

<u>Conductor Size:</u>	<u>2 x 3</u>	<u>4</u>	<u>6</u>
National Tel. Supply	71-258/3X	71-204-P	71-162-J

Copperweld-Copper

<u>Conductor Size:</u>	<u>6A</u>	<u>8A</u>
National Tel. Supply	71-6A-P	71-8A-P

NOTE: These deadends are acceptable when installed with tools and dies in accordance with the deadend manufacturer's recommendations.

Conditional List
cp(1)
July 2002

cp - Deadend, compression type

Manufacturer	Conditions
<u>Burndy</u> AWAC 4-4/3 YTW7M10T AWAC 2-4/3 YTW7M9T AWAC 1/0-4/3 YTW7M7T	To obtain experience.

NOTE: These deadends are acceptable when installed with tools and dies in accordance with the deadend manufacturer's recommendations.

cq - Deadend, Secondary

(For use on secondary deadends only)

Copper
Offset Compression

Conductor Size:	4	6
National Telephone Supply	91-204-P	91-162-J

Copperweld-Copper
Offset Compression

Conductor Size:	6A	8A
National Telephone Supply	91-6A-P	91-8A-P

Copperweld-Copper
Automatic Deadend

Conductor Size:	6A	8A
Hubbell (Fargo)	GD-113	GD-112
MacLean (Reliable)	47FD	

cr-1
July 2002

cr - Bracket, Angle Suspension

Applicable Specifications: "RUS Specification for Angle Suspension Brackets," DT-4

<u>Manufacturer.</u>	<u>Distribution 5/8" Diam</u>	<u>Transmission 3/4" Diam.</u>
Hubbell (Chance)	-	5728
Joslyn	-	J7936
Kortick	K6231	K6230
MacLean (Continental)	U545	U546

cs - Bracket, Pole Top Pin

For Transmission and 24.9/14.4 kV Distribution

Applicable Specifications: "RUS Specifications for Pole Top Brackets for Channel Type Pins," D-14

Hubbell (Chance)	2157
Kortick	K8130
MacLean (Continental)	U36690

ct-1
July 2002

ct - Plate, Double Arming

Transmission

Manufacturer	4" x 1/2" x 24"	4" x 1/4" x 17"
Dixie	D5844	D5845
Hubbell (Chance)	5844	5819
Joslyn	J1600	-
Kortick	K1454	K1465
Line Hardware	-	DAP-17
MacLean (Continental)	U4117	-

cu - Brace, crossarm, wood

Span, inches	60	60
Drop, inches	18	30
	<hr/>	<hr/>
Aluma-Form	6018	6030
Brooks	446-60-18	446-60-30
Dis-Tran	DT-60R	-
Hatheway Patterson	320-R	325-R
Hughes Brothers	2045-CC	2045-D
Joslyn	J4760R	J4730RW
Pennington	15018	15030
Utilities Structures Eng. Inc.	CU-60-18	CU-60-30

Braces listed below have 26-inch hole spacing. They are to be used in place of the flat steel braces previously listed on page h.

Aluma-Form	AF626
Brooks	58128
Hatheway Patterson	7026
Hughes Brothers	2023
Joslyn	J5526

Brace, crossarm, fiber reinforced plastic

Dulmison	CAB-28
Hughes Brothers	533
MacLean (Continental)	CRB-28

cx-1
July 2002

cx - Splice, oval tube

Copper

Conductor Size:	0 x 7	2 x 3	4	6
National Tel. Supply	464	463	459	457

Copperweld-Copper

Conductor Size:	6A	8A
National Tel. Supply	460	459

cy - Splice, Compression

ACSR

Conductor Size	Alcoa	Blackburn	Burndy
4 6/1	2-piece		"Unisplice"
4 7/1	Order	Type RC	(1-piece)
2 6/1	by	1-piece	or Y-S
2 7/1	Conductor	Order	(2-piece)
1/0	Size	by	Order by
2/0	and	Conductor	Conductor
3/0	Stranding	Size	Size and
4/0	"	and	Stranding
		Stranding	
266.8 kcmil 18/1			
336.4 kcmil 18/1			
477 kcmil 18/1			
266.8 kcmil 26/7	2-piece		2-piece
336.4 kcmil 26/7	Compression		Type YTS
477 kcmil 26/7	Alloy Type		"
556.6 kcmil 26/7	CJ		"
795 kcmil 26/7			"
954 kcmil 54/7			"

Conductor Size	Hubbell(Anderson)	Hubbell (Fargo)	Kearney/Cooper Power Systems	
			2 pc	1 pc
	VC-36R			
4 6/1	VC-36R	-	-	OH4-61-71AS
4 7/1	VC-36R	-	-	OH4-61-71AS
2 6/1	VC-36R	-	-	OH2-61-71AS
2 7/1	VC-50R	-	-	OH2-61-71AS
1/0	VC-50R	TJA-8129	OH1/0-61A	OH1/0-61AS
2/0	VC-61R	TJA-7729	OHR2/0-61A	-
3/0	VC-61R	TJA-7829	OHR3/0-61A	-
4/0	-	TJA-7929	HR4/0-61A	-
	VC-80-R			
266.8 kcmil 18/1	VC-80-R	-	-	-
336.4 kcmil 18/1	VC-90-R	-	-	-
477 kcmil 18/1	-	-	-	-
	VC-831-1-RM			
266.8 kcmil 26/7	VC-831-1-RM	Uni-grip	HR-266-267A	-
336.4 kcmil 26/7	VC-832-2-RM	one die	HR336-267A	-
477 kcmil 26/7	VC-833-3-RM	system	HR-477-267A	-
556.5 kcmil 26/7	VC-835-4RM	Order by	HR-556-267A	-
795 kcmil 26.7	VC-835-4RM	conductor size	-	-
954 kcmil 54/7	-	and stranding	-	-

NOTE: These splices are acceptable when installed with tools and dies in accordance with the splice manufacturer's recommendations.

cy-1.1
July 2002

cy - Splice, Compression

ACSR

Conductor Size	Nat. Tel. Supply	Homac	ESP
4 6/1	"Nicopress"	"Tension	FTR-4
4 7/1	(1-pc. or 2-pc.)	splicer"	FTR-4
2 6/1	Order by Conduc-	(1-piece or	FTR-2
2 7/1	tor Size and	2-piece	FTR-2.5
1/0	Stranding	Order by	FTR-1/0
2/0	2-pc.	Conductor	FTR-2/0.5
3/0	"	Size and	FTR-3/0
4/0	"	Stranding	FTR-4/0
266.8 kcmil 26/7	"	2-pc.	-
336.4 kcmil 26/7	"	"	-
477 kcmil 26/7	"	"	-
556.5 kcmil 26/7	"	"	-
795 kcmil 26/7	-	-	-
954 kcmil 54/7	-	-	-

NOTE: These splices are acceptable when installed with tools and dies in accordance with the splice manufacturer's recommendations.

Splice, Compression

Copper and Copperweld-Copper

Conductor Size	Burndy	Homac	Hubbell (Anderson)	Kearney/Cooper Power Systems	National Tel. Supply
6 cu	YDS6W	J2C3	VCC-28	OH6C	1-162/J
4 cu	YDS4W	L2C5	VCC-28	OH4C	1-204/P
2 x 3 cu	YDS2C-3	S2C7	-	OH2-3CX	1-258/3X
0 x 7 cu	YDS25	U2C9	-	OH1-7C	1-325/7F6
8A CWC	YDS8KT	L2E1	VCC-28	OHR8ACW	1-8A-P
6A CWC	YDS6KT	L2E3	VCC-28	OHR6ACW	1-6A-P
4A CWC	YDS4KT	Q2E5	VCC-37	OHR4ACW	1-4A-X
2A CWC	-	U2E7	VCC-43	-	-

NOTE: These splices are acceptable when installed with tools and dies in accordance with the splice manufacturer's recommendations.

cy - Splice, compression
(one-piece)

(For 6201 and 5005 Aluminum Alloy Conductors)

Conductor Size	Burndy	Blackburn	Homac
#4 thru 4/0	"Unisplice"	Type RC	"Tension Splicer"
	Order by Conductor Size and Stranding	Order by Conductor Size and Stranding	Order by Conductor Size and Stranding

Conductor Size	Hubbell (Anderson)	ESP
#4 thru 4/0	Type VC-R	Type FTR
	Order by Conductor Size and Stranding	order by size and stranding

NOTE: These splices are acceptable when installed with tools and dies in accordance with the splice manufacturer's recommendations.

cy - Splice, compression

1-piece splice for ACSR

Manufacturer	Conditions
<u>*ALCOA</u> "Jiffy Joint"	To obtain experience.

1-piece splice for AWAC

<u>Burndy</u>	To obtain experience.
AWAC 4-4/3 YDS7M10T	
AWAC 2-4/3 YDS7M9T	
AWAC 1/0-4/3 YDS7M7T	

*Satisfactory for use with 6201 and 5005 all aluminum alloy conductor through 4/0 and 19 strand conductors of sizes 266.8 kcmil and 477 kcmil.

NOTE: These splices are acceptable when installed using tools and dies in ccordance with the splice manufacturer's recommendations.

cz - Splice for Steel Strand (Overhead Ground Wire)

Compression

Single Sleeve Only

	High Strength Steel		Extra High Strength			Aluminum Clad Steel		
	<u>3/8"</u>	<u>7/16"</u>	<u>5/16"</u>	<u>3/8"</u>	<u>7/16"</u>	<u>7 No. 9 AWG</u>	<u>7 No. 8 AWG</u>	<u>7 No. 7 AWG</u>
Alcoa				4914.386	4916.453			
Burndy	YTS375E	YTS438E				YDS7M9T	YDS7M8T	YDS7M7T
Hubbell (Fargo)	811425	811630	811222	811425	811630	811425	811427	811630
Kearney	HR-3/8-3-7S							
National Tel. Supply	5-7/12OG92	5-7/145J22						
<u>Steel and Aluminum Sleeves</u>								
Homac	28414 (Two piece)							
<u>Automatic</u>								
MacLean (Reliable)	5002	5043	5041	5042	5043	5042	5042	5043
<u>Bolted Type</u>								
Electroline	GD-537							
<u>Formed Type</u>								
Helical Line Products	HS-310-3/8"	HS-311-7/16"						
Hubbell (Chance)	10SS 3/8C	16SS 7/16C	6SS 5/16C	10SS 3/8C	16SS 7/16C			

da - Bracket, insulated

	Bracket without Insulator	Bracket with 1-3/4" Spool Insulator	Bracket with 3" Spool Insulator
Dixie	D0327	-	-
Hubbell (Chance)	0327	0327-C909-1032	0327-C909-1304
Hughes Brothers	1077LI	1077SI	1077I
Joslyn	J1300	-	-
Kortick	K9278	K9081	K9082

dh - Ground, pole

(For system grounds, see ground rods on page ai.)

Manufacturer

Catalog Number

Galvanized Steel Plate With Insulated Copper Lead

(For connecting to a copper or aluminum ground wire above ground.)

Line Hardware

PGPS-56CL8

Galvanized Steel Plate with Connector

(For connecting to a galvanized iron ground wire)

Line Hardware

PGPS-56C

Copper Plate

Blackburn

GP-100

Drabco

D 101

Eritech

EGP-100

Homac

5575

Joslyn

J9196

Line Hardware

PGPC-56

dl - Pipe Spacer

3/4" diameter x 1-1/2" length

<u>Manufacturer</u>	<u>Catalog Number</u>
Dixie	D2031
Hubbell (Chance)	2237
Joslyn	J2031
MacLean (Continental)	U36695

dm - Bracket, transformer
(For cluster mounting of two or three transformers on pole)

Manufacturer	Transformer Size, kVA	Band Type	Through Bolt Type
Aluma-Form	3-50 75-100	6M3-6 15M3-6	3MW-24-M 11MW-24
Barfield Manufacturing Co.	3-50 75-100	BMAC-366 BMAC-3156	- -
Dixie	3-25 37-1/2-50 75-100	- - -	DW-50 DW-50 DW-167
Hubbell (Chance)	3-50 75-100	C6M3-6 C15M3-6	- -
Hughs	3-25 37-1/2-50 75-100	- - -	3021 3020 3020 with adapter plates and back plate
Joslyn	3-25 37-1/2-50 75-100	- - -	J6865 J6864 J6866
Turner	3-25 37-1/2-50 75-100	- - -	305-25 305-100 305-100

For mounting of two transformers

Aluma-Form	3-100 3-50	- -	DM-4M2 DM-2M2
Hubbell (Chance)	3-100	-	C212-0001
Hughes	3-50	-	3022
Turner	3-50	-	205-25

dp - Clamp, ground wire

Transmission

For grounding steel towers and substation structures

Bolt Included

(For use with copper ground wires)

<u>Manufacturer</u>	<u>Catalog Number</u>
AMP	81416-3
Penn-Union	GH-30-C-A1
Royal Switchgear	12202-T (Type LCS)
Square D	GC-143A--OZ

For use in: Pole Grounding Assembly TM-9
Capacitor Assemblies M9-11, M9-12 and M9-13

<u>Manufacturer</u>	<u>For 5/8" Bolt</u>	<u>For 3/4" Bolt</u>
Dixie	D-5452	-
Joslyn	J1163	J1164
MacLean (Continental)	SBL-33	-

dq-1
July 2002

dq - Eye Screw, Elliptical

For use in deadending triplex type service cable, Drawing K10C.

Manufacturer	Catalog Number
Joslyn	J8930

dr - Clevis, conduit, insulated

For use in deadending triplex service cable, Drawing K16C.

Applicable Specifications: "RUS Specifications for Insulated Conduit Clevises and Conduit Wire-holders for
Pipe Mast Deadends," D-16

Joslyn

J0311*

*Insulator not included. See page cm for spool insulator.

ds-1
January 2003

ds - Wireholder, conduit

For use in deadending open wire services on pipe masts, Drawing K17

Applicable Specifications: "RUS Specifications for Insulated Conduit Clevises and Conduit Wireholders,"
D-16

<u>Manufacturer</u>	<u>Catalog Number</u>
Dixie	D-4010
Hubbell (Chance)	C207-0075

ds - Wireholder, conduit

<u>Manufacturer</u>	<u>Conditions</u>
<u>Joslyn</u> J0588Z (nylon alloy)	To obtain experience.

dt-1
July 2002

dt - Deadend, service

For deadending triplex type service cable, Drawing K10C.

Manufacturer	ACSR Size	Catalog Number	
		Wedge Type	Formed Type
Blackburn	4	W62-1	-
Dulmison	4	-	SG0570
	2	-	SG0735
	1/0	-	SG0915
	2/0	-	SG1020
Helical Line Products	4	-	HSG-514
	2	-	HSG-518
	1/0	-	HSG-522
Penn-Union	4	WDC-2S	-
Preformed Line Products	4	-	SG-4502
	2	-	SG-4504
	1/0	-	SG-4506
	2/0	-	SG-4507
	3/0	-	SG-4508
	4/0	-	SG4509
MacLean (Reliable)	4	7195	-
	2	7187	-
	1/0	7287	-

du - Link, Extension

DISTRIBUTION

<u>Manufacturer</u>	<u>Catalog Number</u>
Joslyn (Flagg)	PA319
Hubbell (Chance)	C207-0112
MacLean (Bethea)	LCE-14
MacLean (Continental)	CEL-14

TRANSMISSION

(25,000 lbs. min. strength)

Joslyn	J26082
MacLean (Bethea)	ASM 7209-I-BC

Guy Extension Link
(For "H" Structure)

<u>Manufacturer</u>	<u>One Guy Attachment</u>	<u>Two Guy Attachment</u>
Joslyn	J22421	J26025

NOTE: The distribution extension links may be substituted for anchor shackle (Item bo), eye bolt (Item o) and eye nut (Item aa) for both small and large conductor drawings shown in RUS Form 803 and RUS Bulletin 50-3 at the option of the owner.

du - Connecting Links for Pole Bands

Conditions - To obtain experience in conjunction with pole bands [Item fv(1)]

For Use With Medium Duty Pole Bands

Manufacturer	Link to Insulators	Size	Minimum Strength Rating
Hughes Bros.	3176	3/8"x3"x9-1/2"	25,000 lbs.
Joslyn	J26034	3/8"x3"x9-1/2"	25,000 lbs.

Link to Guy

Hughes Bros.	3154	3/8"x2"x9-1/2"	36,000 lbs.
Joslyn	J26035	3/8"x3"x9-1/2"	36,000 lbs.

For Use With Heavy Duty Pole bands

Manufacturer	Link to Insulators	Size	Minimum Strength Rating
Hughes Bros.	3157	3/8"x3"x12"	36,000 lbs.
Joslyn	J26035 - 2	3/8"x3"x9-1/2"	36,000 lbs.

Link to Guy

Hughes Bros.	3157	3/8"x3"x12"	51,000 lbs.
Joslyn	J26037	1/2"x3"x12"	51,000 lbs.

dy - Bolt, eye, double arming

Applicable Specification: ANSI C135.4, "Standards for Galvanized Ferrous Eye Bolts and Nuts for Overhead Line Construction."

Applicable Sizes : 5/8 inch, 14 through 26 inch length
3/4 inch, 14 through 26 inch length

The following manufacturers have shown compliance with the applicable specifications:

Dixie Electrical Manufacturing Company
Hubbell (Chance)
Joslyn Manufacturing Company
Kortick Manufacturing Company
MacLean (Continental)

dz-1
January 2003

dz - Clip, Guy Wire

Manufacturer	5/16"	3/8"	7/16"	1/2"
Hubbell (Chance)	6453	6454	6455	6456
MacLean (Continental)	U4953	U4954	U4955	U4956

ea - Insulator and stud, post type, vertical

DISTRIBUTION (RUS Minimum Requirements)

System voltage, kV	12.5/7.2	12.5/7.2	24.9/14.4
Leakage, inches	7-1/2	10	15
Cantilever strength (pounds)	1875	1875	1875
Flashover, dry, kV	65	70	95
Flashover, wet, kV	40	50	65

Lapp

7" Stud	4415P	4420P	4427P
1-3/4" Stud	4315P	4320P	4327P

Newell Porcelain

7" Stud	-	43570-7040	47101-7040
1-3/4" Stud	-	43570-7010	47101-7010

Porcelain Products (Knox)

7" Stud	5115-6510	5120-6510	5127-6510
1-3/4" Stud	5115-6500	5120-6500	5127-6500

DISTRIBUTION or TRANSMISSION

ANSI Class	57-2	57-3	57-4
System voltage, kV	22	34.5	46

Lapp

7" Stud	9435	9445	9455
1-3/4" Stud	9335	9345	9355

Newell Porcelain

7" Stud	37620-7040	41640-7040	41650-7040
1-3/4" Stud	37620-7010	41640-7010	41650-7010

Porcelain Products (Knox)

7" Stud	5135-6512	5145-6512	-
1-3/4" Stud	5135-6502	5145-6502	-

ea - Insulators, horizontal post type

Manufacturer	34.5 kV	69 kV	115 kV
Lapp	F-4745	F-4788	F-70147
Locke	-	LS025I3	LS050I3
Newell Porcelain	43740-7700	43790-7700 47043-7700	-
Victor Insulators, Inc.	62356	62359	-

ea - Insulator, post type

<u>Manufacturer</u>	<u>Conditions</u>
<u>Victor Insulators, Inc.</u> 2120 (12.5/7.2 kV) 2127 (24.9/14.4 kV) 62055 (22 kV) 62056 (34.5 kV)	To obtain experience.

eb - Bracket, Pole Top
For Post type Insulators

DISTRIBUTION

Hubbell (Anderson) (14.4 or 7.2 kV)	84324-2000
Hubbell (Chance) (14.4 or 7.2 kV)	1B4
Joslyn (Flagg) (14.4 or 7.2 kV)	P526
Lapp (Line Ware) (14.4 or 7.2 kV)	304043
Line Hardware (14.4 or 7.2 kV)	PTIB-375A
MacLean (Continental) (14.4 or 7.2 kV)	PTB-55-8
Universal Electric (14.4 or 7.2 kV)	PT-8R

TRANSMISSION

Hubbell (Chance)	1B4
Joslyn (Flagg)	P532
Lapp (Line Ware)	304044
MacLean (Continental)	PTB-66H

ec - Bracket, Offset Neutral

Dixie	D-2353
Hubbell (Chance)	C206-0004
Joslyn	J2352

ed - Support, overhead ground wire

Applicable Specifications: "RUS Specifications for Overhead Ground Wire Support Brackets," T-2

Pole top diameter, inches	6-8	8-10	10-12
Dixie	-	-	D7760
Hubbell (Chance)	-	5432	5432
Hughes Brothers	-	2859-12	2859-14
Joslyn	-	J6394	J6395
Kortick	K3580	K3581	K3582
MacLean (Continental)	UC1238	UC1239	UC1240

ef - Bolt, clevis

Applicable Specifications: "RUS Specifications for Clevis Bolts," DT-7

	<u>Dia. (Inches)</u>	<u>8"</u>	<u>10"</u>	<u>12"</u>	<u>14"</u>
Hubbell (Chance)	5/8	15808	15810	15812	15814
	3/4	15828	15830	15832	15834
Joslyn	5/8	J7808	J7810	J7812	J7814

eg-1
July 2002

eg - Plate, crossarm reinforcing

TRANSMISSION

For 5-5/8" x 7-3/8" crossarm

Manufacturer	Catalog Number
Hubbell (Chance)	4047
Hughes Brothers	1113.88
MacLean (Continental)	U3838

eh - Hook, ball

Manufacturer	Catalog Number
Joslyn (Flagg)	13400
Hubbell (Anderson)	HB-30
Lapp	7055
Lindsey	3310
Line Hardware	BH-30
MacLean (Bethea)	BH-5

ei - Clamps, suspension with socket eye

ACSR with Straight or Formed Armor Rods

		AWG			kcmil					
		1/0 & 2/0	3/0	4/0	266.8	336.4	477	556.5	795	954
<u>Iron or Steel Clamps</u>										
Hubbell (Anderson)	MS-82-S	--	MS-104-S	MS-104-S	--	--	--	--	--	--
Hubbell (Chance)	FGW4S	--	--	--	--	--	--	--	--	--
Lapp	305743S	--	--	--	--	--	--	--	--	--
MacLean (Bethea)	FS-83-S	--	--	--	--	--	--	--	--	--

ACSR with Straight or Formed Armor Rods

	AWG		kcmil					
	1/0 & 2/0	3/0 & 4/0	266.8	336.4	477	556.5	795	954
<u>Aluminum Alloy Clamp</u>								
C & R	CRSC-1S	CRSC-2S	CRSC-3S	CRSC-3S	--	--	--	--
Dulmison	--	HSU	HSU	HSU	HSU	HSU	HSU	HSU
Hubbell (Anderson)	HAS-85-S	HAS-104-S	HAS-104-S	HAS-118-S	HAS-139-S	HAS-147-S	HAS-182-S	HAS-182-S
Lapp	306029S	306030S	306030S	306031S	306032S	--	--	--
*Preformed	--	AGS	AGS	AGS	AGS	AGS	AGS	AGS
MacLean (Bethea)	LS-1-S	LS-2-S	LS-2-S	LS-3-S	LS-4-S	LS-6-S	LS-7-S	LS-8-S

*Clevis type available.

ej - Clamps, deadend with socket eye

ACSR

	AWG	kcmil					
	2/0 to 4/0	266.8	336.4	477	556.5	795	954
		<u>Iron or Steel Clamps (requires armor tape or liner)</u>					
Hubbell (Anderson)	-	80445-2000	80445-2000	-	-	-	-

Aluminum Alloy Clamps (do not require armor tape or liner)

Anderson/Hubbell	SD-57-S	SD-70-S	SD-70-S	SD-86-S	SD-86S	--	--
C & R	CR-10-60S	CR-20-60S	CR-20-60S	--	--	--	--
Lapp	305757S	305758S	305759S	305760S	--	--	--
MacLean (Bethea)	ADE-21-S	ADE-22-S	ADE-23-S	ADE-24-S	ADE-24-S	ADE-2526-S	ADE-2526-S

NOTE: When used with clevis-type insulators for large conductors on distribution lines, order clamp with clevis eye.

ek - Locknuts

For Bolt Diam., in.:	<u>MF Type</u>				
	<u>3/8</u>	<u>1/2</u>	<u>5/8</u>	<u>3/4</u>	<u>7/8</u>
Dixie	D3510	D3511	D3512	D3513	--
Hubbell (Chance)	3510	3511	3512	3513	3514
Hughes Brothers	MF30	MF50	MF60	MF70	--
Joslyn	J8581	J8582	J8583	J8584	J8584-1/2
Kortick	K1065	K1066	K1067	K1068	--
Line Hardware	SLN38	SLN50	SLN58	SLN34	SLN78
MacLean (Continental)	U4920	U4921	U4922	U4923	U4924

el - Sectionalizer

Manufacturer	Type
Cooper Power Systems	GH (with crossarm mounting bracket KA27G)

el - Sectionalizer

Manufacturer	Conditions
<u>Cooper Power Systems</u>	
Sectionalizer, three-phase Type GN3	To obtain experience.
Sectionalizer with 125 kV BIL accessory Type GH, 15 kV, single phase	1. To obtain experience. 2. For use on single-phase taps of 24.9/14.4 kV multi-grounded wye systems.
*Sectionalizer, three-phase Type GN3E 14.4 kV, 200 amp max.	To obtain experience.
*Sectionalizer, three-phase Types GV and GVC 14.4 kV, 400 amp. max.	To obtain experience.
*Sectionalizer, three-phase Types GW and GWC 34.5 kV, 400 amp. max.	To obtain experience.
<u>General Electric</u>	
Sectionalizer, single-phase cutout-type - 15 kV and 25 kV Model 9F41F	To obtain experience.
<u>Hubbell (Chance)</u>	
Sectionalizer, single-phase Type CRS single-phase, Cutout type 15 kV, 95 kV BIL 200 amp max. 27 kV, 125 kV BIL 200 amp max. 38 kV, 150 kV BIL 200 amp max.	To obtain experience.
<u>Joslyn</u>	
Sectionalizer, three-phase, 15 kV, 400 and 600 amperes 25 kV, 600 amperes Model VBM with VT or RS control	To obtain experience.

*NOTE: Ratings greater than 100 ampere for 12.5/7.2 kV application and greater than 200 ampere for 24.9/14.4 kV application are acceptable only with ground trip device.

NOTE: Cutout type sectionalizers may also be used with cutout frames listed on pages af-1 and ax-1. Consult manufacturer for application.

em - Brace, crossarm, special
(angle alley arm)

DISTRIBUTION

15" span, 14" drop; 1-1/2" x 3/16"

Dixie	D17939
Kortick	K1978
MacLean (Continental)	U5514

TRANSMISSION

2'-6" span x 1'-8" drop 3'-6" span x 2'-3" drop

	<u>1-3/4" x 3/16"</u>	<u>1-3/4" x 3/16"</u>
Hubbell (Chance)	-	6999
Hughes Brothers	AS-2309-B	AS-2309-A
Kortick	K1975	K1976
MacLean (Continental)	U5509	U5510

eq - Narrow Profile Brackets and Special Arm Assemblies

METAL BRACKETS

Manufacturer	Conditions
<u>Dixie</u> Deadend bracket assembly D21142 for 12.5/7.2 kV Deadend bracket assembly D21144 for 24.9/14.4 kV	1. To obtain experience. 2. For use only in scenic areas and locations where right-of-way is limited. 3. Not to be used where conductor galloping may be expected.
<u>Hubbell (Anderson)</u> Standoff bracket, COB-E-180-TGL	Same as above.
<u>Hubbell (Chance)</u> Single post insulator brackets C206-0209 for 12.5/7.2 kV construction only C206-0010 for 24.9/14.4 kV construction Deadend bracket assembly, C206-0179 Deadend bracket assembly, C206-0211 for 24.9/14.4 kV construction	Same as above.
<u>Joslyn (Flagg)</u> Standoff bracket, PA619B	Same as above.
<u>MacLean (Continental)</u> Standoff bracket IACB-18-5	Same as above.

eq - Narrow Profile Brackets and Special Arm Assemblies

METAL BRACKETS

Manufacturer	Conditions
<u>Joslyn</u> Single post insulator brackets 24840.1, for 12.5/7.2 kV construction only 24840.2, for 24.9/14.4 kV construction	1. To obtain experience. 2. For use only in scenic areas and locations where right-of-way is limited. 3. Not to be used where conductor galloping may be expected.
<u>MacLean (Bethea)</u> Single post insulator bracket, HBF-10-9-GC Standoff bracket VIB3-18-GC	Same as above.
<u>Universal Electric</u> Single post insulator bracket, SAB-3-18-GC	Same as above.
<u>Western Power Products</u> Single post insulator bracket, HDB-200-R, for 12.5/7.2 kV construction only.	Same as above.

eq - Narrow Profile Brackets and Special Arm Assemblies

FIBERGLASS REINFORCED PLASTIC
For 12.5/7.2 kV

Manufacturer	Conditions
<u>Hubbell (Chance)</u> Two-phase pin bracket C653-0638 Standoff insulator C653-0621 Deadend arm C653-1023	1. To obtain experience. 2. For use only in scenic areas and locations where right-of-way is limited. 3. Not to be used where conductor galloping may be expected. 4. Not to be used in contaminated atmospheres.
<u>MacLean (Continental)</u> Two-phase pin bracket GPB2-568M-36V Two-phase angle bracket GPB2-568M-36E Standoff insulator GPB-58M-13 Standoff insulator GPB-58M-18 Deadend arm GDEA-58-3.0-36-2E Suspension bracket GPB-58M-18E	Same as above.
Single Phase Straight Pin Bracket, 15 Degrees AD15-SS-13 AD15-SS-18	Same as above.
Two-phase pin bracket 6742-36P Standoff insulator bracket 6745-13P Standoff insulator bracket 6745-18P	Same as above.

eq - Narrow Profile Brackets and Special Arm Assemblies

FIBERGLASS REINFORCED PLASTIC
For 12.5/7.2 kV

Manufacturer	Conditions
<u>Joslyn (Flagg)</u> Two phase angle bracket 7561-336E Two phase pin bracket 7561-436 Standoff insulator 7561-012 Standoff insulator 7561-018 Suspension bracket 7561-818 Standoff bracket 7561-218 Deadend arm 7554-636-4E	1. To obtain experience. 2. For use only in scenic areas and locations where right-of-way is limited. 3. Not to be used where conductor galloping may be expected. 4. Not to be used in contaminated atmospheres.
<u>Hughes Brothers</u> Two-phase angle bracket 761-36-8 Two-phase pin bracket 813-36 Standoff insulator, 560-13 Standoff insulator, 560-18 Suspension bracket, 615-18 Deadend arm, 540-36 Standoff bracket, 892-18	Same as above.

eq - Narrow Profile Brackets and Special Arm Assemblies

FIBERGLASS REINFORCED PLASTIC
For 24.9/14.4 kV

Manufacturer	Conditions
<u>Hubbell (Chance)</u> Two-phase pin bracket C653-0987 Standoff insulator C653-0988 Deadend arm C653-1024	1. To obtain experience. 2. For use only in scenic areas and locations where right-of-way is limited. 3. Not to be used where conductor galloping may be expected. 4. Not to be used in contaminated atmospheres.
<u>Joslyn (Flagg)</u> Standoff insulator 7581-120X Standoff insulator 7561-118X Two-phase pin bracket 7561-448X Standoff bracket 7561-218 Deadend arm 7554-648-4E	Same as above.
<u>MacLean (Continental)</u> Two-phase pin bracket GPB2-568M-44-V-1.375 Two-phase pin bracket GPB2-558H-48-V-1.375 Standoff insulator GPB-58M-19-V-1.375 Standoff insulator GPB-58H-20-V-1.375 Standoff bracket GPB-5568M-18-GIACB Deadend arm GDEA-58-3.0-48-2E Single Phase Vertical Pin Bracket, 15 Degrees AD15-SV-19T Single Phase Apparatus Bracket, 15 Degrees AA15-STC-18	Same as above. Same as above.
Standoff insulator bracket 6882-18P Standoff Insulator Bracket 6744-19P-1.375 Standoff insulator bracket 6748-20P-1.375 Two-phase pin bracket 6742-44P-1.375 Two-phase pin bracket 6747-48P-1.375	Same as above.

eq - Narrow Profile Brackets and Special Arm Assemblies

FIBERGLASS REINFORCED PLASTIC
For 24.9/14.4 kV

Manufacturer	Conditions
<u>Hughes Brothers</u> Deadend arm, 540-48 Standoff insulator, 880-20 Two-phase pin bracket, 883-48 Standoff insulator, 870-19 Two-phase pin bracket, 862-44 Standoff bracket, 892-18	<ol style="list-style-type: none">1. To obtain experience.2. For use only in scenic areas and locations where right-of-way is limited.3. Not to be used where conductor galloping may be expected.4. Not to be used in contaminated atmospheres.

eq - Narrow Profile Brackets and Special Arm Assemblies

WOOD ARM ASSEMBLIES

Manufacturer	Conditions
<u>Aluma-Form</u> Arm assembly, 12.5/7.2 kV XA-3812 Arm assembly, 24.9/14.4 kV XA-4214	1. To obtain experience. 2. For use only in scenic areas and locations where right-of-way is limited. 3. Not to be used where conductor galloping may be expected. 4. Not to be used as deadend structures.
<u>Hughes Brothers</u> Deadend arm, 2890-J complete with braces and attaching hardware, fittings and bolts	1. To obtain experience. 2. For use only in scenic areas and locations right-of-way is limited. 3. Not to be used where conductor galloping may be expected.

eq - Narrow Profile Brackets and Special Arm Assemblies

COMBINATION INSULATORS AND BRACKETS

Manufacturer	Conditions
<u>Salisbury</u> Horizontal Post 12.5/7.2 kV, 9561 24.9/14.5 kV, 9562	1. To obtain experience. 2. For use only in scenic areas and locations where right-of-way is limited. 3. Not to be used where conductor galloping may be expected. 4. Not to be used in contaminated atmospheres.

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er - Wire Guard, Plastic

See Drawing M-24

Manufacturer	Type orCatalog Number
Hubbell (Chance)	PFG
Hubbell (Fargo)	GM-936
Preformed Line Products (Tree Guard)	PTG

es - Splice Cover, Plastic

(For use over compression type service connections in place of tape.)

<u>Manufacturer</u>	<u>Type</u>
Hubbell (Anderson)	Type SEC
Kearney/Cooper Power Systems	Type 601
Plastic Engineering & Sales Co.	Wire Splice Cover
3M	PST Series 8420
Virginia Plastics	Type VP

Splice Cover and Moisture Seal for Secondary Cable Connections
(See Drawings G312 and UM5)

<u>Manufacturer</u>	<u>Type</u>
AMP	Sealing & Dielectric Compound
Plymouth/Bishop	10 Plyseal
3M	Scotch Brand #2200

Bolted Connector Cover

(For use over bolted type service connections in place of tape.)

<u>Manufacturer</u>	<u>Type</u>
Hubbell (Anderson)	PTC
Hubbell (Fargo)	GA-9000 B Series

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eu - Extension Link
(Fiberglass)
(Distribution)

Manufacturer	Strength	Catalog Number
	15,000 lbs.	GSB2-12
Dulmison	11,000 lbs.	HSB-1-12*
	15,000 lbs.	HSB-2X-12
Joslyn (Flagg)	11,000 lbs.	150-12EE
	15,000 lbs.	150-12EE
Hubbell (Anderson)	10,000 lbs.	GSB1-9*
K-Line	15,000 lbs.	KL Series
MacLean (Continental)	11,000 lbs.	GEE11-12*
	15,000 lbs.	GEE15-12

*For use with 6" suspension insulators.

ex - Splice, formed type

Manufacturer	Conditions
<u>Preformed Line Products</u>	
Splice for ACSR	To obtain experience.
FTS full tension splice	
Splice for AWAC	For repair only.
LS-0185 for 4-4/3	To obtain experience.
LS-0188 for 2-4/3	For repair only where alumoweld strands are not
LS-0191 for 1/0-4/3	broken.

fc - Capacitors, Shunt
12470/7200 Volts

Manufacturer	Size	1 Bushing	2 Bushing	3 Bushing
ABB	100 kvar	A10009	A10010	
	150 kvar	A15009	A15010	
	200 kvar	A20009	A20010	
	300 kvar	A30009	A30010	
	400 kvar	A40009	A40010	
Cooper Power Systems	50 kvar	CEP120B6	CEP120A6	
	100 kvar	CEP131B6	CEP131A6	
	150 kvar	CEP132B6	CEP132A6	
	200 kvar	CEP140B6	CEP140A6	
	300 kvar	CEP160B6	CEP160A6	
	400 kvar	CEP170B6	CEP170A6	
	500 kvar	CEP180B6	CEP180A6	
General Electric Film/Foil Type	25 kvar	52L226RC	52L206RC	
	50 kvar	51L226RC	51L206RC	
	100 kvar	54L226RC	54L206RC	
	150 kvar	54L526RC	54L506RC	
	200 kvar	58L126RC	58L106RC	
	300 kvar	59L226RC	59L206RC	59L611RC

24900/14400 Volts

Manufacturer	Size	1 Bushing	2 Bushing	3 Bushing
ABB	100 kvar	A10031	A10032	
	150 kvar	A15031	A15032	
	200 kvar	A20031	A20032	
	300 kvar	A30031	A30032	
	400 kvar	A40031	A40032	
Cooper Power Systems	50 kvar	CEP123B9		
	100 kvar	CEP130B9		
	150 kvar	CEP139B9		
	200 kvar	CEP143B9		
	300 kvar	CEP163B9		
	400 kvar	CEP173B9		
	500 kvar	CEP183B9		
General Electric Film/Foil Type	50 kvar	51L252RC		
	100 kvar	54L252RC		
	150 kvar	54L552RC		
	200 kvar	58L154RC		
	300 kvar	59L154RC		
	400 kvar	98L154RC		

fd - Hangers, Capacitor

Crossarm Mounting

	1 unit	2 units	3 or 4 units
ABB	85B397G01	791C644G01	791C644G02
Cooper Power Systems	CH1A1	CH2A2	CH4A1
General Electric	39F41G2	39F53	39F80G1

Pole Mounting

	Single Phase	Three Phase	
		In Line	Cluster
ABB	AL30R (3 units)	(1 units)	
	AL60R (6 units)	AL30R	(3 units)
		AL60R	(6 units)
		AL90R	(9 units)
		(3 units)	
		AL13W	(1 unit)
		AL23W	(2 units)
		AL33W	(3 units)
		AL43W	(4 units)
		AL53W	(5 units)
Aluma-Form	CR-3* thru CR-6*	CR-3/4*	3-CR-3/4*
General Electric	39F41G1 (1 unit)	39F86G1	
	39F83G1 (3 units)		

* Available with oil switch mounting bracket.

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fg - Crossarm Saddle

(3-3/4" x 4" with 1-1/4" x 1/4" flange)

Manufacturer	Catalog Number
Lapp	10369

fi - Connectors, hot line

Over Armor Rods

<u>Manufacturer</u>	<u>Catalog Number or Series (Al to Al)</u>	<u>Catalog Number or Series (Al to Cu)</u>
Blackburn	PGH	-
Hubbell (Anderson)	AC Series	AC-GP-Series
Hubbell (Fargo)	GA-100 Series	GA-100C Series

fj - Bracket, extension

(For use in mounting circuit reclosers or sectionalizers)

See Drawing VM3-10A

	Through Bolt Type	Band Type
Aluma-Form	TBRSM-1, TB2M1-9*	RSM-1
Dixie	D-2359-M	
Joslyn	J2357	

*For mounting double lug reclosers.

fk - Bracket, circuit recloser or sectionalizer

(For cluster mounting of three circuit reclosers on pole)

	Cluster Mount	Rack Mount
Aluma-Form	RSM-3, 6M3-9*	3SPR-66, 3SPR-84
Turner	695-3	

*Suitable for 14.4 and heavy duty 7.2 kV.

fl - Rack, primary metering

(For cluster mounting of primary metering equipment on pole)

Aluma-Form	PMM Series
Barfield Manufacturing Co.	BAPMM6
Turner	3CT-PT

fm - Extension Bracket for Mounting Apparatus
(Arrester, Cutouts and Potheads for Distribution Pole Mounting)

Manufacturer	Application Voltage	Single Phase	Three Phase
Aluma-Form	12.5/7.2 kV	1HCA-18 Series	R3CA-48
		1HCA-C-18	
	24.9/14.4 kV	WBMA-1	R3CSA-48
Barfield Mfg. Co.	12.5/7.2 kV	BAC 1256	
	24.9/14.4 kV	BAC 1710	
	12.5/7.2 kV	BACA 126 (double mounting)	
	24.9/14.4 kV	BACA 1710 (double mounting)	
Dixie	12.5/7.2 kV	D-1580	D27211-G
	24.9/14.4 kV	D-1583	-
Hubbell (Anderson)	12.5/7.2 kV	COB-E-120-TGL	-
	24.9/14.4 kV	ACOB-E-180	-
		COB-E-180-TGL	-
Hubbell (Chance)	24.9/14.4 kV	C653-1038	C653-1056
Hughes Brothers	12.5/7.2 kV	892-18	670-40
	24.9/14.4 kV		
Joslyn (Flagg)	12.5/7.2 kV	PA613B	7510-730
	24.9/14.4 kV	PA619B	7510-740-17
Line Hardware	12.5/7.2 kV	CA-12-3GL	-
MacLean (Bethea)	12.5/7.2 kV	VIB3-18-R1-GC-C	
		VIB3-12F-GC	
	24.9/14.4	VIB3-18-GC	
MacLean (Continental)	12.5/7.2 kV	IACB-12-5LGE	GPB-3-0-568M-3012-CAT 12
	24.9/14.4	IACB-18-5LGE	GPB-3-0-568M-4017-CAT 12
Modern Aluminum	12.5/7.2 kV	V183-12	
Universal Electric	24.9/14.4 kV	SAB-3-18-GC	

Note: Above brackets are not suitable for supporting nor deadending distribution line conductors. (See items "eq" for narrow profile bracket and special arm assemblies.)

fn - Extension Bracket for Mounting Cutouts

Refer to item fm.

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fo - Bracket, Transformer Secondary, Insulated

Manufacturer Insulator	Bracket Without Insulator	Bracket With 2-1/4" Diameter Spool Insulator	Bracket With 3-1/8" Diameter Spool
Hubbell (Chance)	-	9113S	9114S
Joslyn	-	J6765-A	J6765
Maclean (Continental)	U865	U865/208	U865/205

fp - Oval Eye Ball
(30,000 lbs; to be used with 52-3 and 52-5 insulators)

Manufacturer	No.
--------------	-----

(No accepted items at this time)

Conditional List

fq(1)

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fq - Laminated Upswept Arms

Applicable Specification: RUS Specification DT-5B

Applicable Drawing: RUS Drawing TUS-1

Manufacturer

Conditions

Hughes Brothers

Types:

C-4080A (5-1/8" width)

C-4080B (5-1/8" width)

C-4113A (3-1/8" width)

C-4113B (3-1/8" width)

1. To obtain experience.

2. For use only in scenic and urban areas where
right- of-way is limited.

fs - Pole Bearing Plate

Manufacturer	Conditions
<u>Dixie</u> D-6370-GR	1. To obtain service and operating experience on cross-braced transmission structures. 2. For determining corrosion resistance. 3. For determining structure uplift capability of the pole under various soil and moisture conditions.
<u>Joslyn (Flagg)</u> P325B-122	Same as above.
<u>MacLean (Continental)</u> PB-80-7	Same as above.

ft-1
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ft - Y-Clevis Ball

Manufacturer	Catalog Number
Joslyn	BT 3030

fu - Swinging angle bracket

(TRANSMISSION)

Applicable Specification: T-8

Swinging angle bracket with hardware and fittings

<u>Manufacturer</u>	<u>2' - 0"</u>	<u>3' - 6"</u>	<u>Type #1</u>	<u>Type #2</u>
Brooks	64233A	64233B	X	
Hughes Brothers	2848	2848	X	X

fv-1
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fv - Guying Attachments
Transmission

Pole Eye Plates*
25,000 lbs. @ 90°/36,000 lbs. @ 45°

<u>Manufacturer</u>	<u>Single Eye</u>		<u>Double Eye - 7/8" Bolts</u>
	<u>3/4" Bolts</u>	<u>7/8" Bolts</u>	
Joslyn (Flagg)	PX37D	-	PX42
MacLean (Continental)	EPR-66S-12	-	-

*Capacity of pole eye plate

fv - Guy Attachments, Pole Bands Attachments, Pole Bands
With Through Bolts for Transmission Lines

Medium Duty Pole Bands

25,000 lbs @ 90°/36,000 lbs @ 45°*

<u>Manufacturer</u>	<u>Pole Band and Associated Hardware**</u>	<u>Conditions</u>
Hughes Bros.	3108.x-2718.55	To obtain experience.
Joslyn	J25968. x GL	To obtain experience.

Heavy Duty Pole Bands

36,000 lbs. @90° /51,000 lbs. @ 45°*

<u>Manufacturer</u>	<u>Pole Band and Associated Hardware**</u>	<u>Conditions</u>
Hughes Bros.	3107.x-2718.55	To obtain experience.

* For a guy lead greater than 1/1, capacity of pole band should be derated.

** Associated hardware includes through bolt, band connecting bolts, nuts, grounding clip and lag screws (if any). Connecting links (Item du (1)) of the required strength should be ordered separately from the same manufacturer.

ga - Watthour and Watthour-Demand Meters
1Ø, 2 and 3 wire or 2/3 wire 120/240 volts

(Classes 100, 200, 10, and 20)

Self-Contained Types

1 Manufacturer	2 Type of Base	3 Watthour Meter Type	4 Mechanical Demand Watthour Type	5 Thermal Demand Watthour Type	6 Number of Terminals
ABB	Bottom Con. Socket	- AB1	- -	- -	- 4
General Electric	Bottom Con. Socket	I50A I70S	IM50A IM70S	- -	4 4
Landis & Gyr	Bottom Con. Socket	- MS	- BMS-2S	- TMS	- 4
Schlumberger	Bottom Con. Socket	J5SA J5S*	J5DSA J5DS	- -	- 4

Transformer Rated Types

ABB	Bottom Con. Socket	- AB1	- -	- -	- 5 or 6
General Electric	Bottom Con. Socket	I50A I70S	IM50A IM70S	- -	5 or 6 5 or 6
Landis & Gyr	Bottom Con. Socket	- MS	- BMS	- TMS	- 5 or 6
Schlumberger	Bottom Con. Socket	J5SA J5S	J5DSA J5DS	- -	- 5 or 6

* Type J4ES for Class 320

ga - Watthour and Watthour-Demand Meters
Polyphase 2 element - 3 wire, 240 volts - Delta and 120/208 Volts Network

(Classes 100, 200, 10, and 20)

Self-Contained Types

Manufacturer 1	Type of Base 2	Watthour Meter Type 3	Mechanical Demand Watthour Type 4	Thermal Demand Watthour Type 5	Number of Terminals 6
ABB	Bottom Con. Socket	- ABS-5	- -	- -	- -
General Electric	Bottom Con. Socket	V62A V62S	VM62A VM62S	- -	5 -
Landis & Gyr	Bottom Con. Socket	- MT012S or 13S	- BMT-12S or 13S	- TMT-12S	- 5 or 8
Schlumberger	Bottom Con. Socket	SL2A SL2S SL12S	SL2DA SL2DS SL12DS	- - -	5 or 8 - -

Transformer Rated Types

ABB	Bottom Con. Socket	ABA-2 ABS-2	- -	- -	- 8
General Electric	Bottom Con. Socket	V63A V63S	VM63A VM63S	- -	8 -
Landis & Gyr	Bottom Con. Socket	MT-5A MT-5S	BMT-5A BMT-5S	TMT-5A TMT-5S	8 8
Schlumberger	Bottom Con. Socket	SL3A SL3S	SL3DA SL4DS	- -	- 8

ga - Watthour and Watthour-Demand Meters
Polyphase 2 element - 4 wire Delta - 120/240 volts

(Classes 100 or 200)

Self-Contained Types

Manufacturer 1	Type of Base 2	Watthour Meter Type 3	Mechanical Demand Watthour Type 4	Thermal Demand Watthour Type 5	Number of Terminals 6
ABB	Bottom Con. Socket	ABA-7	-	-	7 or 8
		ABS-7	-	-	-
General Electric	Bottom Con. Socket	V66A	VM66A	-	7
		V66S	VM66S	-	-
Landis & Gyr	Bottom Con. Socket	-	-	-	-
		MT-15S	BMT-15S	TMT-15S	7
Schlumberger	Bottom Con. Socket	SL6A	SL6DA	-	-
		SL6S	SL6DS	-	7 or 8

ga - Watthour and Watthour-Demand Meters
Polyphase - 2-1/2 element - 4 wire wye - (120/208) (277/480) volt

(Classes 100, 200, 10, and 20)

Self-Contained Types

1 Manufacturer	2 Type of Base	3 Watthour Meter Type	4 Mechanical Demand Watthour Type	5 Thermal Demand Watthour Type	6 Number of Terminals
ABB	Bottom Con.	ABA-8	-	-	-
	Socket	ABS-8	-	-	-
General Electric	Bottom Con.	V65A	VM65A	-	7
	Socket	V65S	VM65S	-	-
Landis & Gyr	Bottom Con.	-	-	-	-
	Socket	MT-14S	BMT-14S	TMT-14S	7
Schlumberger	Bottom Con.	SL5A	SL5DA	-	-
	Socket	SL5S	SL5DS	-	7 or 8
<u>Transformer Rated Types</u>					
ABB	Bottom Con.	ABA-8	-	-	-
	Socket	ABS-8	-	-	13
General Electric	Bottom Con.	V65A	VM65A	-	7 or 13
	Socket	V65S	VM65S	-	-
Landis & Gyr	Bottom Con.	MT-6A	BMT-6A	TMT-6A	10
	Socket	MT-7S or 6S	BMT-7S or 6S	TMT-7S or 6S	7 or 13
Schlumberger	Bottom Con.	SL5A	SL5DA	-	-
	Socket	SL5S	SL5DS	-	13

ga - Watthour and watthour-Demand Meters
Polyphase - 3 element - 4 wire wye - (120/208) (277/480) volt
(Classes 100, 200, 10, and 20)

Self-Contained Types

Manufacturer 1	Type of Base 2	Watthour Meter Type 3	Mechanical Demand Watthour Type 4	Thermal Demand Watthour Type 5	Number of Terminals 6
ABB	Bottom Con. Socket	ABA-3 ABS-3	- -	- -	- 7 or 8
General Electric	Bottom Con. Socket	V64A V64S	VM64A VM64S	- -	- 7 or 8
Landis & Gyr	Bottom Con. Socket	- MT-16S	- BMT-16S	- -	- 7
Sangamo	Bottom Con. Socket	S4A S4S	S4DA S4DS	- -	- 7 or 8

Transformer
Rated Types

ABB	Bottom Con. Socket	ABA-3 ABS-3	- -	- -	- -
General Electric	Bottom Con. Socket	V64A V64S	VM64A VM64S	- -	- 13
Landis & Gyr	Bottom Con. Socket	MT-9A MT-9S or 10S	BMT-9A BMT-9S or 10S	- -	12 13
Sangamo	Bottom Con. Socket	SL4A SL4S	SL4DA SL4DS	- -	- 13

ga - Meters, Min/Max Indicating

Ammeters Indicating

<u>Manufacturer</u>	<u>Type</u>	<u>Description</u>
Biddle	50,000 Series	Thermal, Max Pointer
Demico	AD121R	Digital min/max ampere demand meter
ED Electric	Max-I-Meter(all models)	Thermal Ammeter
Schlumberger	ADS	Thermal Ammeter

Voltmeter, Min/Max

<u>Manufacturer</u>	<u>Type</u>	<u>Description</u>
Bitronics	VMAMC1	Digital Demand min/max voltmeter
Demico	AV121R	Digital min/max voltmeter
Reid and Rochon Associates	LVM-100	Digital Demand min/max voltmeter

ga - Watthour and Watthour-Demand Meters

Manufacturer	Conditions
<u>Landis & Gyr</u> Special base, 3 wire, 1 ø watthour meter, Type MS-K, Class 400 watthour and mechanical demand Type BMS-K watthour and thermal demand Type TMS-2K	1. To obtain experience. 2. To be used only where Class 400 meters are permitted by local regulatory bodies.
Socket base, 3 wire, 1 ø watthour meter, Type MS-E, Class 300	1. To obtain experience. 2. To be used only where Class 300 meters are permitted by local regulatory bodies.

ga - Watthour and Watthour-Demand Meters
Solid State Registers

Manufacturer	Conditions
<u>ABB</u> Solid State Polyphase Watthour meter, Alpha line, A1, A and S type bases (all forms) Class 20 and 200, 120, 240, 277, and 480 V	To obtain experience.
<u>GE</u> kV Vector Meter Form 10A, 36A, 45A, 48A, 3S, 9S, 36S, 45S 56S; Class 20; 120 V to 480V or 57V to 120V Form 13A, 16A; Class 150; 120V to 480 V Form 2S, 12S, 16S; Class 200 or 320; 120V to 480V	To obtain experience
<u>Landis & Gyr</u> Solid State Watthour Meter Type DDS2, Form 5S, 6S, 8S, 9S, 10S, Class 20.	To obtain experience.
<u>Schlumberger</u> CENTRON Form 2S, Class 200. Solid State or Mechanical Register.	To obtain experience.
FULCRUM SQ400 Form 5A, 6A, 9A, 5S, 6S, 9S, 10S, Class 20	To obtain experience
FULCRUM SL300 Series Form 5A, 6A, 8A, 9A, 5S, 6S, 8S, 9S, 10S, 12S, 14S, 15S, 16S, Class 20 and 200.	To obtain experience
QUANTUM Q200 Series Form 5A, 6A, 8A, 9A, 5S, 6S, 8S, 9S, 10S, 26S, Class 20 and 200.	To obtain experience
QUANTUM Q300 Series Form 6A, 9A, 6S, 9S, 10S, Class 10 and 20.	To obtain experience
VECTRON SVX Form 5A, 6A, 8A, 10A(9A), 5S, 6S, 9S(8S), 12S, 16S(14S, 15S), 26S, Class 20 and 200.	To obtain experience
<u>Transdata, Inc.</u> MARK-V EMS Form 5S, 5A, 6S, 6A, 8S, 8A, 9S, 9A Class20	To obtain experience.

ga - Watthour and Watthour-Demand Meters
Solid State Registers

Manufacturer	Conditions
<u>Siemens</u>	
Altimus Solid State Meter	To obtain experience.
Form 1S, Class 100	
Form 25S, Class 200	
Form 2S, Class 200TA30 and 200TA50	
Form 2SE, Class 320TA30 and 320TA50	
Form 2K, Class 480/600	
Form 3S, 4S, Class 10 and 20	
S4 Polyphase Solid State Meter	
Form 5S/45S, 6S/36S, 9S/8S, Class 20	
Form 12S, 16S, Class 200	

gb - Meter Sockets

Type or Catalog Number				
<u>Manufacturer</u>	<u>Ring</u>	<u>Ringless</u>	<u>No. Jaws</u>	<u>Rating Amps.</u>
ABB	#S		4, 5, 6	100
	STS		5, 6	200/400** 1ø 3w
	STS-2		8	200/400** 3ø 3w
	STS-3		13	200/400** 3ø 4w Y or Delta
	STS-7		8	200/400** 3ø 4w Delta
	STS-8		8 or 13	200/400** 3ø 4w Y
		STA-2		200/400 3ø 3w
		STA-3		200/400 3ø 4W Y or Delta
# Anchor		STA-7		200/400 3ø 4w Delta
		STA		200/400 1ø 3w
	1000 Series (1003-1006)	1000 Series (1003-1006)	4, 5	100
	1100 Series (1100-1109)	1100 Series (1100-1109)	4, 5, 7	150
	1200 Series (1201-1209)	1200 Series (1201-1209)	4, 5	200
		1200/1300 Series (1275-1300)	4, 5, 7	200
	1600 Series (1600-1661)	1600 Series (1600-1661)	4, 5	320
	1500 Series (1500-1526)	1500 Series (1500-1526)	4, 5	100/125 per sta.
	1500 Series (1530-1536)	1500 Series (1530-1536)	4, 5	150 per sta.
	1500 Series (1540-1546)	1500 Series (1540-1546)	4, 5	200 per sta.
	1400 Series (1405-1473)	1400 Series (1405-1473)	4, 5, 6, 7, 8, 13	20/100
Murray	SJ Series* (Single)	RJ Series* (Single)	4, 5, 6	100
	SN Series* (Single)	RN Series* (Single)	4, 5, 6	100
	SS Series* (Single)	RS Series* (Single)	4, 5, 6	200
		RH Series* (Single)	5, 7	200 HD

#Available with UL label
*UL label

gb - Meter Sockets

<u>Manufacturer</u>	<u>Type or Catalog Number</u>		<u>No. Jaws</u>	<u>Rating Amps.</u>
	<u>Ring</u>	<u>Ringless</u>		
Durham	R-RS512	RS502#	4 or 5	150
	R-RS502		RS512#	
		H-4300 Series#	4, 5, 7	320
		H-5300 Series#		
		H-7300 Series#		
	RS101-RS111#	RS101-RS111#	4 or 5	100
	2R1121-6R1131#	2R1121-6R1131#		
	2R1421-6R1431#	2R1421-6R1431#		
	RS202#	RS202#	4 or 5	200
	RS212, RS213#	RS212, RS213#	4 or 5	200
Dyna-Tech	RS220-RS233#	RS220-RS233#		
	2R2332-6R2392#	2R2332-6R2392#		
	<u>Overhead</u>			
	1100-C - 1107-C	1000-C - 1007-C	4 & 5	100
	1300-C - 1307-C	1200-C - 1207-C	4 & 5	100
	2100-CH-2107-CH	2000-CH-2007-CH	4 & 5	200
	2300-CH-2307-CH	2200-CH-2207-CH	4 & 5	200
	<u>Underground</u>			
	2590-CHU-2597-CHU	2590-CHU-2597-CHU	4 & 5	200
	2790-CHU-2797-CHU	2790-CHU-2797-CHU	4 & 5	200
General Switch		2090-CHU-2097-CHU	4 & 5	200
		2290-CHU-2297-CHU	4 & 5	200
	42100 Series*		4, 5, 6	100

*UL Label
#Available with UL label

gb - Meter Sockets

<u>Manufacturer</u>	<u>Type or Catalog Number</u>		<u>No. Jaws</u>	<u>Rating Amps.</u>
	<u>Ring</u>	<u>Ringless</u>		
Landis & Gyr	<u>Overhead</u>			
	AS Series	AS Series	4, 5, 6	100-200
		A2 thru A6	4, 5	100-200
		Series (Multiple Mounting)		
		CQ#	4, 5, 7	200
	<u>Underground</u>			
		HQ#	4, 5, 7	200 HD
		HQ-T	6, 7, 8, 13	20
		RSU#	4, 5, 6	200
		CQ-U#	4, 5, 7	200
Milbank		HQ-U#	4, 5, 7	200
	<u>Overhead</u>			
		S7462, 3,4,5,6		
		U7362*, 3,4,5,6	4 or 5	100
		R7486 Series*	4 or 5	100
		U7262 Series*	4 or 5	150
		U7021 Series*	4 or 5	200
		U9550 Series*	4 or 5	200 (HD)
		U9700 Series*	7	200 (HD)
	<u>Underground</u>			
		U8086-XL*	4 or 5	100
		U8084-XL*	4 or 5	150
		U7040-XL*	4 or 5	200
		U9551-XL*	4 or 5	200 (HD)
		S9701-XL	7	200 (HD)

Available with UL label
*UL label

gb - Meter Sockets

<u>Type or Catalog Number</u>				
<u>Manufacturer</u>	<u>Ring</u>	<u>Ringless</u>	<u>No. Jaws</u>	<u>Rating Amps.</u>
Superior	<u>Overhead</u>			
		501	4, 5	100
	314*	414*	4, 5	150
	314*	414*	4, 5	200
		452 Series	4, 5	150 per sta.
	382 Series	482 Series*	4, 5	200 per sta.
		492 Series	7	200 3ø 4w Y or Delta per sta.
		RLK Series*	5, 7	200 3ø 4W Y or Delta 600 V
Superior	<u>Underground</u>			
	314*	414*	4, 5	100
		414*	4, 5	150
		414	7	200 3ø 4w Y or Delta
		"RLPK" Series	5, 7	200 3ø 4w Y or Delta 600 V
		BRL 1915	4, 5	150 per sta.

#Available with UL label

* UL label

** Transformer rating in first figure; maximum loading shown by second figure

gb - Meter sockets

Manufacturer	Conditions
<u>Durham</u> M-400 ampere 4 or 5 jaws for use with Class 10 meters	To obtain experience.
<u>Landis & Gyr</u> Meter mounting device 400 ampere, Type K-4# for use with Type MS-K, 1 ø Duncan meters	1. To obtain experience. 2. To be used only where Class 400 meters are permitted by local regulatory bodies.
Socket type HQ-4S 4 jaws rated for Class 300 service	1. To obtain experience. 2. To be used only where Class 300 meters are permitted by regulatory bodies.
<u>Milbank</u> Type S1079-F, 4 jaws rated for Class 320 service	To obtain experience.

#Available with UL label.

gj - Crossarm Assemblies and Arm Spacers

Distribution

Wood crossarm assembly complete with braces and attaching hardware, fittings and bolts

Crossarm Assembly

<u>Manufacturer</u>	<u>Crossarm Size</u>	<u>Catalog No.</u>
Brooks	3-1/2" x 4-1/2" x 8'-0"	3103-A8
	3-3/4" x 5-3/4" x 8'-0"	3103-C8
	3-3/4" x 7-3/4" x 8'-0"	3203-A8
	3-3/4" x 7-3/4" x 10'-0"	3203-A10
Hughes Brothers	3-1/2" x 4-1/2" x 8'-0"	2890A
	3-3/4" x 5-3/4" x 8'-0"	2890B
	3-3/4" x 7-3/4" x 8'-0"	2892-A
	3-3/4" x 7-3/4" x 10'-0"	2892-B
Pennington	3-1/2" x 4-1/2" x 8'-0"	C500B
	3-3/4" x 5-3/4" x 8'-0"	C500F
	3-3/4" x 7-3/4" x 8'-0"	C500M

Twin Arm Spacer*

To be used with standard hardware, 3-5/8" x 4-5/8" x 8'-0" crossarm, and 28" wood braces

Line Hardware CAS-455

*Restricted to applications where the conductor's maximum design tension is less than 1250 lbs. and to conductor sizes 1/0 ACSR and below.

gj - Crossarm Assemblies

Braceless

Manufacturer	Conditions
<u>Aluma-Form</u> HD-DEA-86-EB-REA HD-2-DEA-86-EB-REA HD-DEA-108-EB-REA HD-2-DEA-108-EB-REA	To obtain experience.
<u>Geotek (PUI)</u> DA2500-96 DA2500-120 DA3000-96 DA3000-120	To obtain experience.
<u>Hughes Brothers</u> 3377-A7.5 3377-A8.5 3377-A9.5	To obtain experience.
<u>MacLean Power Systems</u> PZ08LD PZ10LD PY08SD PY10SD	To obtain experience.
<u>Shakespeare</u> IDB096N1224(X)RUS** XDB096N1224(X)RUS** HDB096N1224(X)RUS** IDB120N1224(X)RUS** XDB120N1224(X)RUS** (**X=2-Gray Color 5-Dark Bronze Color)	To obtain experience

gw-1
July 2002

gw - Crossarm Assembly for H-Frame Construction

Applicable Specification: RUS Specification T-7, Revision dated November 1962
Applicable Drawing: TH-11B Series (161 kV maximum)
No braces (TH-11B)
Two vee braces on outside (TH-11BVO)
Two vee braces on inside (TH-11BVI)
Four vee braces (TH-11BV4)

3-5/8" x 9-3/8" x 33' wood crossarm assembly complete with
attaching hardware, fittings, bolts and 3-3/8" x 5-3/8" braces.

Catalog Nos. or Drawing Nos.

	TH-11B	TH-11BVO	TH-11BVI	TH-11BV4
	<u>Items</u>	<u>Items</u>	<u>Items</u>	<u>Items</u>
(Assemblies)	gw	gw and vo	gw and vi	gw and vv
Brooks (1,2)	6411	6411-1	6411-2	6411-3
Hughes Bros.(1,2)	C3316-B	C3316-B	C3316-B	C3316-B
Pennington (1,2)	CCC11B72	CCC11B72-VO	CCC11B72-VI	CCC11B72-V4

- 1 - Fixed spacer fitting sizes as required
2 - Adjustable spacers are available

gw - Crossarm Assembly for H-Frame construction
(Double Arm) 230 kV (Small Angle)

Applicable Specification: RUS Specification T-8, Drawing: TH-231B

Assembly complete with attaching hardware, fittings, bolts and braces.

Crossarm 3-5/8" x 9-3/8"

<u>Manufacturer</u>	<u>Catalog Number</u>
Brooks (1, 2)	64231
Hughes Brothers (1, 2)	C-3338-B
Pennington (1, 2)	CCC231B82

Crossarm 5-1/8" x 7-1/2"

Brooks (1, 2)	64231L
Hughes Brothers (1, 2)	C-3338-BL
Pennington (1, 2)	CCC231BT

- 1 - Fixed spacer fitting sizes as required.
2 - Adjustable spacers are available.

gy-1
July 2002

gy - Crossarm Assembly for H-Frame Construction
(Double Arm)

Applicable Specification: RUS Specification T-7, Revision dated November 29, 1962

Applicable Drawing: TH-10 Series

No braces (TH-10)
Two vee braces on outside (TH-10VO)
Two vee braces on inside (TH-10VI)
Four vee braces (TH-10V4)

3-5/8" x 9-3/8" x 32' wood crossarm assembly complete with
attaching hardware, fittings, bolts and 3-3/8" x 5-3/8" braces.

Catalog Nos. or Drawing Nos.

	TH-10	TH-10VO	TH-10VI	TH-10V4
	<u>Items</u>	<u>Items</u>	<u>Items</u>	<u>Items</u>
(Assemblies)	gy	gy and vo	gy and vi	gy and vv
Brooks (1,2)	6410	6410-1	6410-2	6410-3
Hughes Bros. (1,2)	C-3316-A	C3316-A	C-3316-A	C-3316-A
Pennington (1,2)	CCC1071	CCC1071-VO	CCC1071-VI	CCC1071-V4
Niedermeyer-Martin (1)	N-6710	N-6711	N-6712	N-6713

1 - Fixed spacer fitting sizes as required

2 - Adjustable spacers are available

gy - Crossarm Assembly for H-Frame Construction
(Double Arm) 230 kV (Tangent)

Applicable Specification: RUS Specification T-8

Applicable Drawing: TH-230

Assembly complete with attaching hardware, fittings, bolts and braces.

Crossarm 3-5/8" x 9-3/8"

Manufacturer	Catalog No.
Brooks (1, 2)	64230
Hughes Brothers (1, 2)	C-3338-A
Pennington (1, 2)	CCC23081
Niedermeyer-Martin (1)	N-6720

Crossarm 5-1/8" x 7-1/2"

Brooks (1, 2)	64230L
Hughes Brothers (1, 2)	C-3338-AL
Pennington (1, 2)	CCC230T

1 - Fixed spacer fitting sizes as required.

2 - Adjustable spacers are available.

gz-1
July 2002

gz - Crossarm Assembly for Wishbone Construction "Z" Type
(Single Arm)

Applicable Specification: RUS Specification T-5

Applicable Drawings: RUS Drawing TSZ-1

3-5/8' x 5-5/8" wood crossarm assembly complete with brace and attaching hardware, fittings, and bolts

The following manufacturers have shown compliance with the applicable specifications for this assembly:

<u>Manufacturer</u>	<u>Catalog Nos. or Drawing Nos.</u>
Brooks	64Z1
Hughes Brothers	C-3162-A and C-3162.10

gz - Crossarm Assembly for Wishbone Construction, "Z" Type
(Double Arm)

Applicable Specification: RUS Specification T-5

Applicable Drawings: RUS Drawings TSZ-2,

3-5/8" x 5-5/8" wood crossarm assembly complete with brace and attaching hardware, fittings and bolts

The following manufacturers have shown compliance with the applicable specifications for this assembly:

Manufacturer	Catalog Nos. or Drawing Nos.
Brooks (2)	64Z2
Hughes Brothers	C-3162-B and C-3162.10

(2) Adjustable spacers are available.

rp - Wildlife Guards

Bushings and Live Parts Covers

<u>Manufacturer</u>	<u>Conditions</u>
<u>Hendrix Wire & Cable</u> Catalog No. BG-9	To obtain experience
<u>Kaddas Enterprises Inc.</u> Catalog No. KE1045A* birdguard Catalog No. KE1066* arrester cap Catalog No. KE1077* transformer bushing cover Catalog No. KE1053* arrester cap Catalog No. KE1064* transformer bushing cover Catalog No. KE 1049* birdguard	To obtain experience

NOTE: The material composition of these items does not contain a flame-retardant unless specified by the manufacturer.

*Specified by manufacturer as being flame-retardant

Anti-Perch Devices

<u>Manufacturer</u>	<u>Conditions</u>
<u>Hendrix Wire & Cable</u> Catalog No. HPP-24	To obtain experience

NOTE: The material composition of these items does not contain a flame-retardant unless specified by the manufacturer.

sb - Switch, disconnect (single-pole, hook operated station class)

NEMA standard switches for station or line structure use where single-pole switching is permissible

Manufacturer	Type	Voltage Ratings	System Voltages Line to Line
ABB	HPL	15 thru 69 kV	12.5 thru 69 kV
Bridges	EH EHL(L)	15 thru 69 kV 15 thru 34.5 kV	12.5 thru 69 kV 12.5 thru 34.5 kV
Cleaveland/Price	LCO-C	15 thru 69 kV	12.5 thru 69 kV
Cooper Power Systems	D2(PL)	15 and 23 kV	12.5 thru 24.9 kV
G & W Electric	B-2M EV(PL)	15 thru 69 kV 15 thru 34.5 kV	12.5 thru 69 kV 12.5 thru 34.5 kV
Hubbell (Chance)	M3(PL)	15 thru 27 kV	12.5 thru 24.9 kV
Joslyn (Hi-Voltage)	HU HI	15 thru 34.5 kV 15 thru 34.5 kV	12.5 thru 34.5 kV 12.5 thru 34.5 kV
Johnson	HPT	15 thru 69 kV	12.5 thru 69 kV
Kearney/Cooper Power Systems	M-72(PL) H-72	15 thru 69 kV 15 thru 34.5 kV	12.5 thru 69 kV 12.5 thru 34.5 kV
MEMCO	STV STU	15 thru 69 kV 15 thru 69 kV	12.5 thru 69 kV 12.5 thru 69 kV
Morgan	DHS(PL)	15 thru 69 kV	12.5 thru 69 kV
Royal Switchgear	BT BLT(PL)	15 thru 69 kV 15 and 23 kV	12.5 thru 69 kV 12.5 thru 24.9 kV
S & C*	LBD(PL) Alduti (L)	15 thru 34.5 kV 15 and 25 kV	12.5 thru 34.5 kV 12.5 thru 24.9 kV

(L) Means solid material load interrupters are available and accepted.

(LV) Means vacuum interrupters are available and accepted.

(PL) Means hooks for portable load interrupters are available for voltages 34.5 kV and below. Consult switch manufacturer concerning loop switching applications at higher voltages.

*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

sb - Switch, disconnect (single-pole, hook-operated station class)

NEMA standard switches for station or line
structure use where single-pole switching is permissible

Manufacturer	Type	Voltage Ratings	System Voltages Line-to-Line
Seeco	BT	34.5 thru 69 kV	34.5 thru 69 kV
Siemens-Allis	HA	15 thru 69 kV	12.5 thru 69 kV
	HS(PL)	15 and 25 kV	12.5 thru 24.9 kV
Southern States	PBO	15 thru 69 kV	12.5 thru 69 kV
	*PBN	15 thru 23 kV	12.5, 13.2, 24.9 kV
USCO	HH(PL)	15 thru 69 kV	12.5 thru 69 kV

(L) Means solid material load interrupters are available and accepted.

(LV) Means vacuum interrupters are available and accepted.

* With steel base only.

(PL) Means hooks for portable load interrupters are available for voltages 34.5 kV and below. Consult switch manufacturer concerning loop switching applications at higher voltages.

sb - Switch, disconnect (single-pole, hook operated distribution class)*

For distribution line use where power class insulation is not required and single-phase switching is permissible.

(Not suitable for substation use)

Manufacturer	Type	Voltage Rating	System Voltage Line-to-Line
Cooper Power Systems	D2(PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
G & W Electric Company	EV(PL)	15 kV	12.5 kV
Hubbell (Chance)	M3(PL)	15 and 27 kV	12.5 thru 24.9 kV
Kearney/Cooper Power Systems	D-73(PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
Morgan	DHS(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
Royal Switchgear	BLT-F(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
S & C**	LBD(PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
Siemens-Allis	HD(PL)	15 and 25 kV	12.5 thru 24.9 kV

NOTE: Switches on this page must be furnished with four bolts for double crossarm mounting.

(L) Means solid material load interrupters are available and accepted.

(PL) Means hooks for portable load interrupters are available.

(LV) Means vacuum interrupters are available and accepted.

*Steel bases only.

**Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

Conditional List
sb(1)
July 2002

sb - Switch, hookstick
(line tension switches)

for use on 12.5/7.2 kV systems only

Manufacturer	Conditions
<u>AMP</u> AMPACT	To obtain experience.
<u>Bridges</u> 127	To obtain experience.
<u>Hubbell (Chance)</u> ALTD06200R	To obtain experience.
<u>Royal Switchgear</u> IL6B-H (available with silicone polymer insulators as catalog number IL6NP)	To obtain experience.

NOTE: All switches listed on this page have hooks for portable load interrupters.

sc - Regulators, Voltage
12.5/7.2 kV
13.2/7.62 kV

Applicable Specification: "RUS Specification for Substation Regulators," S-2.

Type	Size	Description
<u>ABB</u>		
UTS, UTT	167-1000 kVA	(S) Three phase step type
<u>Cooper Power Systems</u>		
VR-32 AB	19.1 - 833 kVA 50 amp.	(SL) Single phase - step type (L) Single-phase - step type (Auto-Booster)
<u>General Electric</u>		
VR-1	38.1 - 509 kVA	(SL) Single-phase - step type
MLT	500 - 1000 kVA	(S) Three-phase - step type
VML-32	500 - 833 kVA	(S) Single-phase - Vacuum step type
VMLT-32	1200 - 2800 kVA	(S) Three-phase - vacuum step type
<u>Siemens-Allis</u>		
JFR	38.1 - 667 kVA	(SL) Single-phase - step type

(L) Indicates line use

(S) Indicates substation use

sc - Regulators, Voltage
24.9/14.4 kV

Type	Size	Description
<u>Cooper Power Systems</u>		
VR-32 AB.	72 - 833 kVA 50 amp	(SL) Single phase - step type (L) Single phase - step type (Auto-Booster)
<u>General Electric</u>		
VR-1	72 - 576 kVA	(SL) Single phase - step type
VML-32	500 - 833 kVA	(S) Single phase - vacuum step type
VMLT-32	1200 - 4666 kVA	(S) Three phase - vacuum step type
<u>Siemens-Allis</u>		
JFR	72 - 833	(SL) Single phase - step type

(L) Indicates line use

(S) Indicates substation use

sc - Regulators, Voltage

Manufacturer	Conditions
<u>General Electric</u> Three-phase, step-type substation regulator Type TMLT-32 (13.2/7.62 kV)	To obtain experience.
<u>Siemens-Allis</u> Three-phase, step-type substation regulator Type SFR (13.2/7.62 kV)	To obtain experience.

sd - Current Transformers
Outdoor Type

Manufacturer	.6 kV	15 kV	25 kV	34.5 kV	69 kV
ABB	CSF/CMS CMF CLC/CLE	KOR-11 KON-11 KOT-11	ICT-150 KOR-I5 KOT-I5	ICT-200 KOR-20 -	ICT-350 - -
Andover	DCBW DCCW DCAB	- - -	- - -	- - -	- - -
G.E.C. Durham Industries (Astra)	AA&TA AB AD&AC	- - -	- - -	- - -	- - -
Electromagnetic Industries (Square D)		CO3-110	CO3-150	CO3-200	IK-350
General Electric	JCR-0 JCW-0 JAK-0 JAD-0	JKW-5 JCK-5 - -	JKW-6 JKW-150 KG-150 -	JKW-7 JKW-200 KG-200 -	JKW-350 KG-350 - -
Kuhlman Electric		BB-15-971 BB-15-972	BB-25-973 BB-25-974	BB-34-975 BB-34-976	COF-350 -
Schlumberger	R6S R6SA R6M R6L	- - - -	- - - -	- - - -	- - - -

NOTE: The transformer types listed above are accepted in all standard ratios. Insulation class, voltages, ratios and other necessary information should be specified when ordering.

sd - Current Transformers
Outdoor Types

Manufacturer	Conditions
<u>Electromagnetic Ind. (Square D)</u> Type UMCT, 0.6 kV Type UCT, 0.6 kV Type IK 4-350-69, 69 kV (cycloaliphatic resin bushings)	To obtain experience.

se - Voltage Transformers

<u>Outdoor Types</u>					
Manufacturer	.6 kV	15 kV	25 kV	34.5 kV	69 kV
ABB	PPM	VOG-II	LPT-I50	LPT-200	LPT-350
	-	VOY-II	VOG-I5	VOG-20	-
	-	VOZ-II	VOZ-I5	VOZ-20	-
Andover	DVE-6	-	-	-	-
	DVF-6	-	-	-	-
Electromagnetic Industries (Square D)		PO5-110	PO5-150	PO5-200	U3-350-69
General Electric	JVA-0	JVW-5	JVW-6	JVW-7	ET-350
	JVP-0	JVW-110	-	-	JVT-350
	-	-	JVT-150	JVT-200	-
Kuhlman Electric	-	PTT-110-977	-	-	POF-350
Schlumberger	T5R	-	-	-	-
	T6R	-	-	-	-
	T7R	-	-	-	-

NOTE: The transformer types listed above are acceptable in all standard ratios. Insulation class, voltages, ratios and other necessary information should be specified when ordering.

se - Voltage Transformers

Outdoor Types

Manufacturer	Conditions
<u>G.E.C. Durham Industries (Astra)</u> Type DB, 0.6 kV Type DA, 0.6 kV Type DF, 0.6 kV	To obtain experience.
<u>Electromagnetic Industries (Square D)</u> Type U-450, 0.6 kV Type U-4-350-69, 69 kV (cycloaliphatic resin bushings)	To obtain experience.

sj-1
July 2002

sj - Switches, oil circuit recloser by-pass

Manufacturer	15 kV For use on 12.5/7.2 kV systems	27 kV For use on 24.9/14.4 kV systems	27 kV* For use on 34.5/19.9 kV systems	Current Rating Amperes
Cooper Power Systems	FW77D7	FW77D9	FW77D9	600
Hubbell (Chance)	M3-R	M3-R	M3-R	600
Kearney/Cooper Power Systems	D73RB	D73RB		600

*Not For Use In Substations

sk - Switch, regulator by-pass - disconnect
For outdoor use

Manufacturer	15 kV for use on 12.5/7.2 kV Systems	27 kV for use on 24.9/14.4 kV Systems	Current Rating Amperes
Kearney/Cooper Power Systems	HB-65	HB-65	600
S & C Electric*	XL	XL	600
Siemens-Allis	HR	HR	600
Southern States	BR	BR	400,600

NOTE: All switches should be furnished with NEMA standard insulators and with 110 kV BIL rating (15 kV systems) or 150 BIL ratings (25 kV systems) for station use.

*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

Conditional List
sk(1)
July 2002

sk - Switch, regulator by-pass - disconnect
For outdoor use

Manufacturer	Conditions
<u>Cooper Power Systems</u> Type B, 15 kV, 400 amperes, 110 kV BIL for station use, 95 kV BIL for line use.	To obtain experience.

NOTE: All switches should be furnished with NEMA standard insulators and with 110 kV BIL rating for station use.

sl - Switch, Combination Power Fuse and Disconnect

(Used with an additional disconnect switch to by-pass
oil circuit reclosers at substations.)

Manufacturer	15 kV for use on	27 kV for use on
	12.5/7.2 kV systems	24.9/14.4 kV systems
Joslyn (Hi-Voltage)	RFH	-
Kearney/Cooper Power Systems	MHX	MHX
S & C Electric*	SMD/LBD	SMD/LBD
	XS/LBD	-
Southern States	SF	-

NOTE: All switches and cutouts should be furnished with NEMA standard insulators.

*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

Conditional List
sr(1)
July 2002

sr - Steel for Substation Grounding, Copper-Clad or Galvanized

(See av-2 for copper grounding conductor)

Manufacturer	Conditions
<u>Copperweld Steel</u> 40% conductivity DSA Copperweld Strand in sizes: 1/2" (7 No. 6 AWG) 9/16" (7 No. 5 AWG) 5/8" (7 No. 4 AWG) 13/16" (19 No. 6 AWG) 7/8" (19 No. 5 AWG)	1. To obtain experience. 2. When used in soil with resistivity of 25 ohm-meters (2500 ohms per centimeter cube) or less cathodic protection must be incorporated into the grounding design.
<u>Indiana Steel & Wire</u> Steel Strand, BB Grade, Class C galvanized 5/8" (19 wire) 1/2" (7 wire) 9/16" (7 wire) 7/16" (7 wire)	1. To obtain experience. 2. When used in soil with resistivity of 25 ohm-meters (2500 ohms per centimeter cube) or less cathodic protection must be incorporated into the grounding design.

vx - Cross Brace assembly, 3-3/8" x 5-3/8"
with hardware and fittings (Dwg. TM-110, RUS Specification T-7)

Manufacturer	Catalog No.
<u>Brooks</u>	
Item 1-vx	6685-1
Item 2-vx	6685-2
<u>Hughes Brothers</u>	
Item 1-vx	1042-1
Item 2-vx	1042-2
<u>Niedermeyer-Martin</u>	
Item 1-vx	N-6714-1
Item 2-vx	N-6714-2
<u>Pennington</u>	
Item 1-vx	CCC-67-1
Item 2-vx	CCC-67-2

Cross Brace assembly, 3-5/8" x 7-1/2" Min.
with hardware and fittings (Dwg. TM-110, RUS Specification T-8)

Manufacturer	Catalog No.
Brooks	6695
Hughes Brothers	2061A
Niedermeyer-Martin	N6721
Pennington	CCC69

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PART II

Underground Distribution Equipment

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U ae - Surge Arresters, Distribution
for Underground System Pole Risers
(Lightning Arresters)

SiC Type

Manufacturer	Type	Accepted Ratings - kV	Duty	Manufacturer's Classification	Housing
ABB	GLV	9, 10	Normal	Distribution	
	LVBB	18	Normal	Distribution	
General Electric	Alugard	9, 10, 18	Heavy	Distribution	
Kearney/Cooper Power Systems	Unigap	9, 10, 18	Heavy	Distribution	

NOTE: The arresters listed on this page may be used singly or in parallel, but must be applied in accordance with paragraph VI.A., in RUS Bulletin 61-3, "Underground Rural Distribution." Other arresters listed on pages ae-1 and ae-2 may be used for underground systems when applied in accordance with this bulletin.

Conditional List

U ae(1)

July 2002

U ae - Arresters, Surge

(Shielded for Underground System Pad-Mounted Equipment)

CONDITION OF ACCEPTANCE: To Obtain Experience

ELBOW ARRESTERS

Manufacturer	Type	Ratings, kV	Type	Interface
Cooper Power Systems	M.O.V.E.	9/10	MOV	15 kV
	M.O.V.E.	18	MOV	25 kV
	VariGAP	9/10	(1)	15 kV
	VariGAP	18	(1)	25 kV
Elastimold ESNA	167 ESA-10	10	MOV	15 kV
	273 ESA-18	18	MOV	25 kV
Hubbell	PDE	9,10	MOV	15kV
	PDE	18	MOV	25kV
Joslyn	ZE	10	MOV	15 kV
		18	MOV	25 kV

PARKING STAND ARRESTERS

Manufacturer	Type	Ratings, kV	Type	Interface
Cooper Power Systems		9/10	MOV	15 kV
		18	MOV	25 kV
	VariGAP	9/10	(1)	15 kV
	VariGAP	18	(1)	25 kV
Elastimold ESNA	167 PSA-10	10	MOV	15 kV
	273 PSA-18	18	MOV	25 kV

BUSHING ARRESTERS

Manufacturer	Type	Ratings, kV	Type	Interface
Elastimold ESNA	167 BSA-10	10	MOV	15 kV
	273 BSA-18	18	MOV	25 kV

(1) MOV Type (Internally Gapped)

U ae - Arresters, Surge
(For Underground System Pole Risers)

CONDITION OF ACCEPTANCE: To Obtain Experience

Manufacturer	Type	MOV Type		Manufacturer' Classification	Housing
		Accepted Ratings - kV	Duty		
ABB	HMX	9,10,18	Heavy	Intermediate *	Polymer
	RMX	9,10,18			
	XPR	9,10,18,27	Heavy		
Cooper	CPS AZR VariSTAR	9,10,18,27	Heavy	Distribution	Porcelain
	URS UltraSIL VariSTAR	9,10,18,27	Heavy	Distribution	Polymer
General Electric	Tranquell ** U.D. II	9,10,18,27	Normal	Distribution	Porcelain
	Tranquell	9,10,18,27	Normal	Intermediate	Porcelain
Hubbell (Ohio Brass)	DynaVar-PVR	9,10,18,27	Heavy	Riser Pole	Polymer
Joslyn	ZJ U.D.	9,10,18	Heavy	Distribution	Porcelain
	ZJP	9,10,18,27	Heavy	Distirbution	Polymer
Kearney/Cooper Power Systems	Univar SGR	9,10,18,27	Normal	Riser Pole	Porcelain

*Has intermediate class arrester characteristics but does not have intermediate class venting capability.

**A non fragmenting U.D. II Arrester is available for 9 & 10 kV designs at higher cost when specified.

Conditional List

U ae(2.1)

July 2002

U ae - Arresters, Surge
(For Underground System Pole Risers)

CONDITION OF ACCEPTANCE: To Obtain Experience

MOV Type (Internally Gapped)

Manufacturer	Type	Accepted Ratings - kV	Duty	Manufacturer's Classification	Housing
Cooper	AZR500 VariGap	9,10,18,27	Heavy	Distribution	Porcelain
	URG UltraSIL	9,10,18,27	Heavy	Distribution	Polymer
	VariGap				

U an - Transformers, Distribution
Pad-Mounted, Dead-Front
(For underground application)

Manufacturer	Single-Phase 5 - 167 kVA	Three-Phase 30 - 2500 kVA
ABB	"Mini-Pak U-5"	Type MTR (75-1500 kVA) "Plazapad-U5" (2000-2500 kVA)
Central Moloney	"REA-LP"	
Cooper	"REA Shrubline"	"REA Terra-Tran"
ERMCO	"Low-Profile"	
General Electric	"Mini-Pad III - REA"	"Compad IV - REA"
Howard	"Hi Pad REA"	"Hi Pad 3 REA"
Kuhlman	"Lo-Pak ELR"	"K-PAK-3 REA"
H. K. Porter (Delta-Star)	"Low Profile U 5-R"	"Porter U5-R3"
Pauwels Tranformers	"Turf-Hugger-R"	"Turf-Hugger-R"
United (KAEC)	"Pad-Mount" 15-100 kVA (1) "Pad-Mount" 25 & 50 kVA (2)	
VanTran	"Mini-Pad U5" (1)	"VanTran III-U5"

NOTES

All acceptances are based on RUS Specification U-5, "Specifications for Pad-Mounted Transformers (Single and Three Phase)."

All single-phase and three-phase transformers above accepted for the following voltages (kV) unless otherwise noted: 12.47/7.2; 13.2/7.6; 24.9/14.4; and 24.9/14.4 x 12.47/7.2 dual voltage

(1) Accepted for 12.47/7.2 kV and 13.2/ 7.62 kV only.

(2) Accepted for 24.9/14.4 kV only.

The enclosures for these transformers have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.

Not all kVA sizes in above kVA ranges are available from all listed manufacturers.

Some of the above single-phase and three-phase transformers are available with internal under oil surge arresters. The availability and type of arresters vary with each manufacturer. The following types of under-oil arresters are acceptable: "UMX", "Tranquell" and "AZU."

U an-2
July 2002

U an - Transformers, Distribution
Pad-Mounted, Dead-Front

(For unit residential underground application)
(Single-phase, 7.2 kV and 7.6 kV)

Manufacturer	5 - 25 kVA Only
ABB	"Micro-Pak U-5"
Central Moloney	"REA-Mini-LP"
Cooper	"Ranch Runner"
ERMCO	"REA-MicroTrim"
General Electric	"Micro-Mini-Pad"
Howard	"Spacesaver Pad"

NOTES

All acceptances are based on RUS Specification U-5, "Specifications for Pad-Mounted Transformers (Single and Three Phase)."

The enclosures for these transformers have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.

U an - Transformers, Distribution
Pad-Mounted, Dead-Front

(For underground application)

Conditions for Acceptance: To Obtain Experience

Manufacturer	Type
<u>ABB</u>	"Mini-Pak U-5" - Single-phase with composite fiberglass enclosure "Mini Three Phase" (MTP) 30 - 225 kVA
<u>Cam Tran</u>	"Cam Tran" - Three-phase, 12.47/7.2 and 13.2/7.6 kV; 30-2500 kVA
<u>Carte</u>	Three-phase, 24.9/14.4 kV, 30 - 2,500 kVA
<u>Cooper Power Systems</u>	Single-phase, self-protected with "Magnex" interrupter Single-phase, self-protected with "AZU" MOV heavy-duty, under-oil arrester
<u>ERMCO</u>	"E-PAD" Three-phase, 12.47/7.2 kV; 30-2,500 kVA "E-PAD" Three-phase, 24.9/14.4 kV; 30-2,500 kVA
<u>General Electric</u>	"Mini-Pad-REA" - Single-phase, 1-100 kVA "Compad -IV-REA" - Three-phase, 75-750 kVA All above with amorphous metal cores
<u>Square D</u>	Class 7230 REA - Three-phase, 75-2500 kVA 12.47/7.2 kV and 13.2/7.62 kV
<u>Van Tran</u>	"Mini-Pad U5" - 5-167 kVA, 24.9/14.4 kV

NOTES

All acceptances are based on RUS Specification U-5, "Specifications for Pad-Mounted Transformers (Single and Three Phase)."

All single-phase and three-phase transformers above conditionally accepted for the following voltages (kV) unless otherwise noted: 12.47/7.2; 13.2/7.6; 24.9/14.4; and 24.9/14.4 x 12.47/7.2 dual voltage

The enclosures for these transformers have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.

Not all kVA sizes are available from all listed manufacturers.

U ax - Cutout and Arrester, Combination
for Underground System Pole Risers

Nominal System Voltage	For 12.5/7.2 kV		For 13.2/ 7.6 kV	For 24.9/ 14.4 kV
Cutout Maximum Voltage Rating	7.8 kV	15 kV	15 kV	27 kV
Application	1ø Risers	3ø Risers	1ø and 3ø Risers	1ø and 3ø Risers
Cutout Current Rating	100 amps	100 amps	100 amps	100 amps
Manufacturer	Catalog Numbers			
ABB	7.8LBU-II/ 10 LV	15LBU-II/ 10 LV	15LBU-II/ 10 LV	24.9LBU-II/ 18 LV
Cooper	AFS300B Series	AFS300C Series	AFS300C Series	AFS300D Series
General Electric	9F80	9F80	9F80	9F80
Hubbell (Chance)	C7 Series	C7 Series	C7 Series	C7 Series
Southern States	CA Series	CA Series	CA Series	CA Series

NOTE: The units listed on this page may be used with single arresters or arresters in parallel, but must be applied in accordance with paragraph VI.A. in RUS Bulletin 61-3, "Underground Rural Distribution." Other arresters listed on pages ae-1 and ae-2 may be used for underground systems when applied in accordance with this bulletin.

Cutouts used on underground riser poles should be loadbreak type or have hooks for portable load interrupters.

Either normal duty or heavy duty distribution class arresters listed on page ae-1 are acceptable for use with these combination units.

U ax - Cutout and Arrester

Combination for Underground System Pole Risers

Metal Oxide Type Arresters

Nominal System Voltage	For 12.5Y/7.2 kV	For 13.2Y/7.6 kV	For 24.9Y/14.4 kV	<u>Conditions</u>
Cutout Maximum Voltage Rating	7.8 kV	15 kV	27 kV	
Application	1ø Risers	3ø Risers	1ø and 3ø Risers	
Cutout Current Rating	100 amps	100 amps	100 amps	

Manufacturer Catalog Numbers

Cooper Power Systems	L4A1P1A00-ECO(9kV)	L9C1P1A00-ECO(9kV)	L9C1P1A00-ECO(9kV)	L9D1P1A00-EGO	To obtain experience
	L4A1P1A00-EDO(10kV)	L9C1P1A00-EDO(10kV)	L9C1P1A00-EDO(10kV)	-	To obtain experience

Note 1: Other arresters listed on pages ae-1 and ae-2 may be used for underground systems when applied in accordance with RUS Bulletin 61-3, "Underground Rural Distribution."

Note 2: Cutouts used on underground riser poles should be loadbreak type or have hooks for portable load interrupters.

Conditional List
U be(1)
July 2002

U be - Reclosers, pad-mounted

Manufacturer	Conditions
<u>Cooper Power Systems</u> Single phase, vacuum interrupter, Type PV4H Maximum voltage 14.4 kV for 12.5 and 13.2/7.62 kV	To obtain experience.

NOTES:

1. Series trip reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device. Shunt trip reclosers without ground trip devices may not be used with trip settings higher than 200 amp for 12.5/7.2 kV application, greater than 400 amp for 24.9/14.4 kV application, and 560 amp for 34.5/19.9 kV application.
2. Reclosers are not acceptable with load current, bushing CT battery chargers.

U cg - Switch, air, three-pole, group-operated
for pole-mounted cable risers
(Factory Preassembled)

Manufacturer	Mounting	Vertical Break		Side Break	
		Type	kV	Type	kV
ABB	Vertical	LB3-VR(L)15		-	
Hubbell (Chance)	Vertical	-		D7(L)15-27	
	Horizontal	-		D7(L)15-27	
Kearney/Cooper Power Systems	Horizontal	SB_R(L)15-35		-	
S & C*	Vertical	-		Alduti(L)15-25	
	Horizontal	-		Alduti(L)15-25	

(L) Means gas or solid material full-load interrupters are accepted and available.

*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

NOTE: Switches with factory-assembled crossarm type bases must have nonconducting crossarm type bases, nonconducting braces, and insulated interphase and control rods.

Conditional List

U cg(1)

July 2002

U cg - Switch, Air, Three-Pole, Group Operated

Manufacturer	Conditions
<u>Hubbell (Chance)</u> Type AR side-break, horizontal and vertical mounting, with non-conducting crossarm type base and insulated interphase and control rods, 15, 25 , and 34.5 kV (grounded wye)	To obtain experience.
<u>S & C*</u> Omni-Rupter (L), side break horizontal and vertical mounting with non-conducting crossarm type base and insulated interphase and control rods, 15 kV and 25 kV	To obtain experience.

(L) Means full-load interrupter accepted and available.

*Available with porcelain insulators. Available with Cypoxy insulators through 34.5 kV on request.

U fw - Secondary Tap Connector

Manufacturer	Type or Catalog No.
Tyco (Raychem)	Compression Connectors
	CRSM-CT-34/10-150
	CRSM-CT-53/13-200
	CRSM-CT-84/20-250
	Standard Split Bolt
	CRSM-CT-53/13-200

U fz - Transformer Connector Block, Insulated
Multiple Cable Connectors

Watertight - For use in all locations

Manufacturer	Connection Type	Catalog Number
Blackburn	Lug	SCU, with lugs and sleeves
Burndy	Lug	Stud Mole with sealing sleeve
Utilco	Set Screw	PTF-SS, Watertight Insulated transformer Connector block

Non-Watertight - For use in above grade locations only

Alcoa	Lug	Interchange 1 ABBD Series (Disconnectable) Use with A9 insulating boots
Alcon	Set Screw	VBTT Series with double sealing sleeve
Blackburn	Set Screw	TSB-J58C (Permanent)
	Set Screw	TSB-D58C (Disconnectable)
Burndy	Set Screw	K-D Series (Disconnectable) K-DF Series (Permanent)
Connector Mfg. Co.	Set Screw	Uni-Joint Bar Connectors, (Series RLS, NSM- C, NDS-C, NSC, ZS-C, ZSU-C, RLUS) (Permanent)
	Set Screw	Uni-Joint Bar Connectors, (Series RLSS, NSSM-C, NSSC, ZQC, ZQU-C, RLUS) (Disconnectable)
ESP	Lug	Types SUR and RDSR(Removable) (With Types LA and AL-lugs and Sleeve kits)
	Set Screw	Type UPSO-I (Permanent) Type UPM-I (Disconnectable)
Homac	Lug	DF Series
	Lug	FTU 125 Series(Disconnectable) with flood seal sleeve kit
	Set Screw	LRT Series
Hubbell (Fargo)	Bolted	GUC Series
	Set Screw	GUS-460S Series
MacLean (Reliable)	Set Screw	15912-REA (Disconnectable)
Penn Union	Lug	Type DBAT (Permanent)
	Lug	Type DBAT-LH (Disconnectable) Use with Series DBTB, DBTBF and DBTH lug and Sleeves kits
Preformed	Set Screw	SC-C series (Permanent)
	Set Screw	CSC-Q-C Series, SC-Q-C series (Disconnectable)
Utilco	Set Screw	PTF-IN (Permanent)
	Set Screw	PTF-CJNU (Disconnectable)
Vector Connectors Corp.	Set Screw	TQL Series (Disconnectable) (with insulating boot)

Note: Additional insulation may be required with some of the above-listed secondary terminal blocks due to the irregularity of mating surfaces between various secondary studs being supplied by the transformer manufacturers.

U gc - Shield, cable riser

Manufacturer	Dia. (Inches)	Length (Feet)
<u>Galvanized Steel</u>		
Electrical Materials	2 - 3 - 4 - 5*	5*
Hubbell (Chance)	2 - 3 - 3 1/2	5 - 9
Joslyn	2 - 3 - 3 1/2*	5 - 8*
Midland-Ross (Kindorf Snapduct)	2 1/2 - 3 1/2 - 5 (14 ga. galv. steel)	2 1/2 - 5 - 10
<u>Plastic and Fiberglass</u>		
Carlton	2 - 3 - 4 - 5 - 6*	10*
Custom Plastics	2 - 3 - 4 - 5*	5 - 10*
Electrical Materials (plastic)	1 - 2 - 3 - 4 - 5 - 6*	5 - 8 - 10*
Applied Extrusion Technologies (plastic) (Power Mold, I, II, III)	2 - 3 - 4 - 5 - 6*	5 - 8 - 10*
Joslyn (plastic)	2*	10*
Nordic (fiberglass)	2 - 3 - 5*	5 - 10*

(Order by size and length)

*All sizes available with back plate.

Full Round**

Smith Fiberglass Products (standard wall)	2 - 3 - 4 - 5	30
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**Full round riser shield is to be mounted directly to the surface of the pole with no standoffs.

U gk-1
July 2002

U gk - Terminations, Indoor

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter.)

Manufacturer	Catalog No.
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PREMOLDED

Cooper Power Systems	Fasterm Stress Cone (15 & 25 kV)
Elastimold (ESNA)	Style 35-MS C (15, 25 & 35 kV)
Hubbell (Chardon)	Termi-Matic, Type A or G (15, 25 & 35 kV)

HEAT SHRINK

G&W	ESTS15_PLA (15 kV) ESTS25_PLA (25 kV)
Hellermann	MVTS15_PLA (15 kV) MVTS25_PLA (25 kV)
Tyco (Raychem)	HVT (15, 25 & 35 kV)

COLD SHRINK

3M	QT III Series (15 kV) Quick Term II Series (25 & 35 kV)
Joslyn	JIPT Series (15, 25 kV) JPT Series (25 kV)
Tyco (Raychem)	TFT Series (15, 25, 35 kV)

INSULATED WRAP

Plymouth/Bishop	Stress-Wrap (15, 25 & 35 kV)
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U gk - Terminations, outdoor
(with mounting hardware)*

(When ordering, specify conductor size, type, whether
copper or aluminum, insulation diameter, and type of
mounting desired.)

Manufacturer	Catalog Number
<hr/>	
POLYMER	
<hr/>	
<u>PREMOLED</u>	
<u>Cooper Power Systems</u>	Fasterm Series (15 & 25 kV)
<u>Elastimold (ESNA)</u>	Style 16-THG (15 and 25 kV) (for bare concentric neutral cable) Style 35-MT (35 kV) (for bare concentric neutral cable) Style PCT-1 (15 kV) (for jacketed cable) Style PCT-2 (25 kV) (for jacketed cable)
<u>Hubbell (Chardon)</u>	Termi-Matic, Type G (15, 25 and 35 kV)
<u>HEAT SHRINK</u>	
<u>G&W</u>	ESTS15_PLO (15 kV) ESTS25_PLO (25 kV)
<u>Hellermann</u>	MVTS15_PLO (15 kV) MVTS25_PLO (25 kV)
<u>Plymouth/Bishop</u>	SWO Kit (15, 25 and 35 kV)
<u>Tyco (Raychem)</u>	HVT (15, 25 and 35 kV)
<u>COLD SHRINK</u>	
<u>Joslyn</u>	JPT Series (15, 25, 35 kV)
<u>Tyco (Raychem)</u>	TFT Series (15, 25, 35 kV)
<u>3M</u>	QT III Series (15, 25, & 35 kV)
<hr/>	
PORCELAIN	
<u>G & W</u>	"Eliminator" 15 kV, E 25 kV, E 35 kV, E
<u>Joslyn</u>	"Easy-On II" (15, 25 and 35 kV)

*Mounting Hardware is used to attach termination to mounting bracket (U hd or U hj).
NOTE: Some of the above terminators may require ordering the mounting hardware separately.

U gn-1
July 2002

U gn - Enclosures, equipment

Applicable Specifications: "RUS Specifications for Equipment Enclosures," U-4

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>Durham</u>	AT-42 Series (dead-front) AT-54 Series (dead-front)
<u>Elliott</u>	EPM-PTS (dead-front)
<u>Malton Electric</u>	ME Series (dead-front) MEV Series (dead-front)
<u>Maysteel</u>	EL100 (dead-front)
<u>Nordic</u>	ND-28 and ND-33
<u>Western Power Products/Cooper Power Systems</u>	300 Series

NOTE:

1. The above enclosures are available with various multipoint terminations. The owner should specify termination points to be provided.
2. These enclosures have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.

U gn - Enclosures, Equipment

Sectionalizing Enclosures

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>Cooper Power Systems</u>	SecTER Series I and II (Single-Phase and Three-Phase)
<u>Durham</u>	AMSP() Series
<u>Fiberglass Fabricators</u>	FSC-32 Single Phase FSC-62 Three Phase
<u>Malton Electric</u>	ME Series MEH Series
<u>Maysteel</u>	CW200 Series CW300 Series
<u>Nordic</u>	ND Series
<u>Power Design Inc.</u>	Type CJP series, single-phase and three-phase, 15 and 25 kV
<u>Rough Rider Industries</u>	Series RUF93
<u>Shallbetter</u>	SPMS Series (dead-front)
<u>Western Power Products/Cooper Power Systems</u>	310 Series

NOTE:

1. The above enclosures are available with various multipoint terminations. The owner should specify termination points to be provided.
2. These enclosures have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.

U go - Fault Indicator
(For Construction Unit UM 6-4)

Manufacturer	Type
Cooper Power Systems	S.T.A.R. CR, DR, ER, MR, TPR
Edison Control Corporation	Series EC100 (single phase) Series EC300 (three phase) (Available with mounting kit KT5002)
Fisher Pierce	Series 1514 (current reset, single-phase) Series 1515 (current reset, three-phase) Series 1541 (time reset, single-phase) Series 1543 (time reset, three-phase) Series 1547 (adaptive trip)
Horstmann GmbH	FCI-LT Series Time Reset 29-3014 (.85 to 1.57 inch) 29-3015 (1.57 to 2.37 inch) Current Reset 29-3114 (.85 to 1.57 inch) 29-3115 (1.57 to 2.37 inch)

Note: Fault indicators that require the drilling or cutting to the enclosure for mounting are not acceptable.

U gp - Connector Blocks and Splices, Secondary

Watertight - For Use In All Locations

Manufacturer	Connection Type	Catalog Number
Alcon	Set Screw	VPB Series
Blackburn	Lug	Series UP (with lugs and sleeves)
	Set Screw	Series USB (1000 amp bus with sleeves)
Burndy	Lug	URD Mole
Connector Mfg. Co.	Compression	Utilug Sure Seal Splice Kits, Series SSK, SSKL
	Set Screw	Uni-Joint Sure Seal Series SSBC
	Set Screw	Secondary Connector ULS2-350
ESP	Lug	Type UC (8 AWG - 500 kcmil) (with LA lug and sleeve)
	Set Screw	Type UPP
Homac	Connector Blocks:	
	Lug	FS-95 Series with flood seal sleeve kit (8AWG - 350 kcmil)
	Lug	FS-125 Series with flood seal sleeve kit (350 - 500 kcmil)
	Set Screw	SHC Series
	Set Screw	RAB Series
	Splices:	
	Compression	RRK Series (#2AWG - 350 kcmil)
	Set Screw	UH11L
	Set Screw	USK Series
	Set Screw	MTB Series
Hubbell (Fargo)	Set Screw	GU-600 Series
Kearney/Cooper Power Systems	Compression	HCR
	Compression	HAR
MacLean (Reliable)	Set Screw	15903-15908, 15910 with sleeve kit (4 AWG - 350 kcmil) 15911 with sleeve kit (500 - 750 kcmil)
Penn Union	Lug	DBA Series with DBTB, DBTBF and DBTH Series lug and sleeve kits
Preformed	Set Screw	HT Kit Series
Raychem	Set Screw	GILS-4/0
Utilco	Set Screw	Safety Sub Splice - USPA-350SS

U gp - Secondary Connector Blocks and Splices, Insulated

Non-Watertight - For Use In Above-Grade Pedestals Only

Manufacturer	Connection Type	Catalog Number
Blackburn	Set Screw	Type PSB-C
Connector Mfg. Co.	Set Screw	Uni-Joint Series NCA
ESP	Set Screw	UPC Series
Homac	Set Screw	CLR-350 Series
	Set Screw	PVAB Series
Hubbell (Fargo)	Set Screw	GUS-460 Series
Utilco	Set Screw	PED-350-IN Series
Vector Connectors Corp.	Set Screw	PC Series

U gq - Boot or sleeve, insulated*

Manufacturer	Catalog Number
Blackburn	MPC9 MPC15
Electrical Materials	100-B (For pad-mounted transformer spade terminals)

*Use restricted to 120/208 volt 500 kVA transformers and larger not equipped with threaded studs.

U gu-1
July 2002

U gu - Pedestal, Power
(Above-Grade)
Refer to Construction Drawing UK5

Applicable Specifications: "RUS Specifications for Secondary Power Pedestals," U-6

Manufacturer	Inside Dimensions Inches	Height Inches	Catalog No.
<u>API</u>	9X10	25-1/2	API 9 X 10
	10X11	34	API 10 X 11
	10X11	12-1/4	API 10 X FM
	10X14	22-1/2	API 10 X 14
	10X14	26-1/2	API 10 X 14 WB
	13 Dia.	25	API 176
<u>Coil Sales</u> (Charles Industries)	8.25 Dia	31-1/2	CPLP-8
	8.25 Dia	31-1/2	CPLP-8I(Integral Stake)
	10.75 Dia	31-1/2	CPLP-10
	10.75 Dia	31-1/2	CPLP-10I(Integral Stake)
<u>Electrimold</u>	14.5 x 19.5	31.5	EFSO-111630
<u>Fiberglas Fabricators</u>	14 X 9	31	FFSP Series
	15.5 X 15.5	30	FFSP Series
	15.5 X 15.5	36	FFSP Series
	14 X 9	42	FFSP Series
	9 X 9	31	FFSP Series
<u>MacLean (Reliable)</u>	8 x 8	38	UP 8HLP
	8 x 8	46	UP 8HP
	10-1/2 x 10-1/2	26	UP 10HLP
	16-1/2 x 10-1/2	36	UP 1016HLP
	10-1/2 x 10-1/2	42	UP 10HP
<u>Nordic</u>	8 x 8	44	PR-50, PR-55
	9 x 14	30	PR-149 (stake)
			PR-150 (stakeless)
	9 x 14	30	PRMC 150 (low profile)
	9 x 14	24	PRMC-160
	9 x 14	30	PRMC-170 (high profile)
	9 x 14	36	PRMC-190
<u>PenCell</u>	11X14	37	AG-15
<u>Western Power Products/</u> <u>Cooper Power Systems</u>	9-1/2 x 9-1/2	30	*SPM-9 DF3
	14-1/2 x 9-1/2	30	*SPM-14 DF3
	9-1/2 x 9-1/2	36	SPM-91 DF3
	9-1/2 x 9-1/2	30	SPM-90 DF3
	14-1/2 x 9-1/2	30	SPM-140 DF3
	14-1/2 x 9-1/2	36	SPM-145 DF3
	18-1/2 x 12	30	SPM-182 DF3
	18-1/2 x 12	54	SPM-190 DF3

U gu - Pedestal, Power
(Above-Grade)
Refer to Construction Drawings UK5

Applicable Specifications: "RUS Specifications for Secondary Power Pedestals," U-6

<u>Manufacturer</u>	<u>Inside Dimensions Inches</u>	<u>Height Inches</u>	<u>Catalog No.</u>
<u>Shallbetter</u>	7.5 x 10.25	39	SUTP Series
<u>Utility Fiberglass</u>	27 x 16	40	PPFP-2700
<u>Vertex</u>	8 x 14	30	SP 814

*Furnished with stake.

**Pole mounted

U gu-2
July 2002

U gu - Power Pedestal
(Below-Grade)
Refer to Drawing UK6

Applicable Specifications: "RUS Specifications for Secondary Power Pedestals," U-6

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>Armorcast</u>	Polymer concrete frame and cover with fiberglass reinforced polyester skirting 6001 Series. P600XXXXA Rotocast Series, molded polyethylene with penta-head bolt
<u>Associated Plastics</u>	Molded polyethylene with galvanized steel or plastic cover Catalog Nos. 1730-1, 3; 1324-1, 3
<u>Blackburn</u>	Molded polyethylene with galvanized steel cover and ground lug. Catalog No. SDR-2PG
<u>Burndy</u>	Molded polyethylene with galvanized steel cover. Catalog No. URD20G23
<u>Carson</u>	Molded polyethylene with plastic cover Catalog No. 1324-12B and 1730-12B
<u>CDR Systems (Homac)</u>	Fiber reinforced polymer concrete - PA Series with penta-head bolts
<u>Christy Concrete</u>	Polyester reinforced plastic - Series FL8TRCBOX, FL9TRCBOX, FL30TRCBOX, FL36TRCBOX
<u>Dexol</u>	HDPE, DX-101, DX-102 ABS, DX-101HD, DX-102HD
<u>Electrimold</u>	Polymer concrete ring and cover with fiberglass reinforced skirting ECAB series. Boxes EPBTH,EPBA series
<u>Fiberglas Fabricators</u>	FFHH Series, Fiberglass FFHHPC Series, Fiberglass polymer concrete hybrid
<u>Highline</u>	HL50AE
<u>Hubbell (Fargo)</u>	HDPE, B-100R Series ABS, B-200R Series HL51

U gu - Power Pedestal
(Below-Grade)
Refer to Drawings UK6

Applicable Specifications: "RUS Specifications for Secondary Power Pedestals," U-6

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>Malton</u>	Fiberglass secondary pedestal FSP31139, FSP301515
<u>Pen-Cell</u>	PE Series-High Density Polyethylene (HDPE) base;lid available in HDPE, fiberglass, aluminum, or stainless steel;PEM Series with modular construction
<u>Quazite</u>	Power Pedestal – PV, Boxes - PX/PE Series, PR/LR Series, PC, PG, LG Series
<u>Thermodynamics</u>	PP-91 and PPV-91 Series

U gv-1
July 2002

U gv - Stake, Power Pedestal
Refer to Construction Drawing UK5

Manufacturer	Length Inches	<u>Catalog No.</u>	
		For Power Pedestal Only	For Joint Pedestal
Hubbell (Fargo)	42-60-72-78	UP-530S Series	UP-530J Series
MacLean (Reliable)	72-78-84	DM Series	DM Series

U hb - Cable Accessories

(When ordering specify conductor size, type whether copper or aluminum and insulation diameter)

(Items on this page are rated for operation on three-phase systems and may be used on single-phase systems.)

200 Ampere Continuous Current Rating

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>Cooper Power Systems</u>	15 kV, used with loadbreak connectors LPC 215 protective cap LBI215 bushing well insert 2637869C01M rotatable two-way bushing well insert 2604231B01 bushing well plug 25 kV, used with loadbreak connectors LPC 225 protective cap LB1225 bushing well insert LB1225L (long) bushing well insert 2637881C01M rotatable two-way bushing well insert 2604231B01 bushing well plug 35 kV, used with loadbreak connectors 2637592B03M protective cap
<u>Hubbell (Chardon)</u>	15 kV, used with loadbreak connectors Switch module 9U02AAB001 Basic connector module 9U05 Series Insulating cap 9U01AEW400 Feed-through insert 9U04AEB001 25 kV, used with loadbreak connectors Switch module 9U02BAB001 Insulating cap 9U01BEW500 Feed-through insert 9U04BEB001

U hb - Cable Accessories
(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

(Items on this page are rated for operation on three-phase systems and may be used on single-phase
systems.)

200 Ampere Continuous Current Rating

Manufacturer	Catalog Number
<u>Elastimold (ESNA)</u>	15 kV, used with loadbreak connectors Style 1601-CL cable lead Style 1602A3R feed thru insert Style 1601-A3R bushing plug Style 160-DR insulating cap
	25 kV, used with loadbreak connectors Style 2701-A2 bushing plug Style 270-DR deadend receptacle
	35 kV, used with loadbreak connectors Style 3701A-3 bushing plug* Style 370DR(G) insulating cap

U hb - Cable Accessories

(When ordering, specify conductor size, type, whether copper or aluminum and insulation diameter)

600 Ampere Continuous Current Rating

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Hubbell(Chardon)</u>	15 kV Deadbreak termination connectors 9U60AAL (with test point) 9U60ABL (without test point) 25 kV Deadbreak termination connectors 9U60BAL (with test point) 9U60BBL (without test point)
<u>Cooper Power Systems</u>	15 kV Deadbreak termination connectors BoI-T System T-OP II System Push-OP System DBA615 Bushing Adapter 25 kV Deadbreak termination connectors BoI-T System T-OP II System Push-OP System DBA625 Bushing Adapter 35 kV Deadbreak termination connectors BoI-T System T-OP II System Push-OP System Optional 200 A. loadbreak tap No. 2637449C
<u>Elastimold (ESNA)</u>	15 kV, used with non-loadbreak connectors 600, 650 Series 25 kV, used with non-loadbreak connectors K600, K650 Series 35 kV, used with non-loadbreak connectors 750LR Series
<u>3M</u>	15 kV, Deadbreak termination connectors 5815 Series Modular Splicing System

U hb - Cable Accessories

(When ordering specify insulation diameter)

Concentric Neutral Clamps (Bonding)

Manufacturer	Conditions
<u>Harco</u> URD cable clamp	<ol style="list-style-type: none">1. To obtain experience.2. Only for bonding of anodes or other metals to the neutrals of <u>existing</u> cable installations.3. Not to be used to connect neutral to grounding electrodes.

U hc - Cable Supports
15 and 25 kV

Manufacturer	Catalog Number	Grip Dia. Range (inches)
Aluma-Form	CS-800 Series	0.75 to 2.0
Economy Cable Grip	SPJ087-U	0.87 to 1.00
	SPJ100-U	1.00 to 1.12
	SPJ113-U	1.12 to 1.25
	SPC125-S-U	1.25 to 1.50
Hubbell (Fargo)	GJ-854	0.718 to 0.919
	GJ-855	0.920 to 1.12
	GJ-856	1.12 to 1.50
Kellums	022-16-011	0.81 to 0.94
	022-16-012	0.87 to 1.00
	022-16-013	0.94 to 1.06
	022-16-014	1.00 to 1.18
	022-16-015	1.06 to 1.25
	022-01-018	1.25 to 1.50
Lewis	A-U-SW-18	0.75 to 1.25
	U-1.12	1.12 to 1.62
Slater	FCSD 14	0.82 to 0.95
	FCSD 15	0.88 to 1.00
	FCSD 16	0.95 to 1.06
	FCSD 17	1.01 to 1.19
	FCSD 18	1.07 to 1.26
	FC125-U	1.25 to 1.50
Woodhead	35032 (SC075-U)	0.75 to 0.99
	35033 (SC100-U)	1.00 to 1.24
	35034 (SC125-U)	1.25 to 1.49

U hd-1
July 2002

U hd - Brackets, pothead mounting, and Brackets, combination pothead and arrester mounting

Manufacturer	Single Phase	Three Phase
Aluma-Form	TB-EMB-1-2PA	TB-EMB-1-6PA

U he - Enclosures, Sectionalizing Equipment

12.5/7.2 kV

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>ABB</u>	UTE, PAD-PAK pad-mounted switching device, single and three-phase, 300 amp
<u>Durham</u>	AFSP Series, single-and three phase
<u>Electrical Equipment</u>	FTDF-P Series, single and three-phase one and two fused taps, pad-mounted
<u>Elliott</u>	Type EPMR, single and three-phase, pad-mounted
<u>Malton</u>	*ME Fused Series, single and three-phase pad mounted
<u>Shallbetter</u>	SPMD Series, single and three-phase, pad-mounted SPMC Series, 200 ampere single-pole switching

*Furnished with current limiting fuses.

NOTES:

1. Enclosures on this page must comply with the dead-front requirements of RUS Spec. U-4.
2. These enclosures have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.
3. Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to RUS Bulletin 61-3.

U he - Enclosures, Sectionalizing Equipment

24.9/14.4 kV

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>ABB</u>	UTE, PAD-PAK pad-mounted switching device, single and three-phase, 200 amp
<u>Durham</u>	AFSP Series, single-and three phase
<u>Elliott</u>	Type EPMR, single- and three-phase, pad-mounted
<u>Malton</u>	ME Fused Series, single and three phase, pad- mounted
<u>Shallbetter</u>	SPMD Series, single and three-phase, pad-mounted

NOTES:

1. Enclosures on this page must comply with the dead-front requirements of RUS Specification U-4.
2. These enclosures have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.
3. Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to RUS Bulletin 61-3.

U he - Enclosures, Sectionalizing Equipment
(200 and 600 amp)

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Cooper Power Systems</u>	Type VFI, single-phase and three phase, padmounted fault interrupters, 15-35 kV Type R-VAC, three-phase vacuum switchgear, 15-25 kV
<u>Electrical Equipment</u>	Type PSI-PSI/II Series, 15 kV, 25 kV, 600 amp., three-phase switching, and 200 amp., single-phase switching. (When ordering, add suffix B-4) Type PSE Series, 15 kV, 25 kV, 600 amp switch, 200 amp fuse Type PGE Series, 15 kV, 25 kV, SF6 interrupter, 3-phase, 600 amp switch, 200 amp fuse
<u>Elliott</u>	Type EPMR, Single and three-phase, pad-mounted, 25 kV
<u>ERMCO</u>	Type FusePad, single-phase, 200 amp, 15 kV
<u>G & W</u>	Type PVI series, single-phase and three-phase, 200 amp and 600 amp, 15 kV and 25 kV
<u>Hubbell (Chance)</u>	Type LVS (pad-mounted) single-phase and three-phase, vacuum switching equipment, fused or unfused, 200 or 600 amp, 15-25 kV Type AIS padmounted, air insulated switchgear, fused or unfused, 200 or 600 amp, 15 kV or 25 kV

Notes:

1. Enclosures on this page must comply with the deadfront requirements of RUS Spec. U-4.
2. These enclosures have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.
3. Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to RUS Bulletin 61-3.

U he - Enclosures, Sectionalizing Equipment

(200 and 600 amp.)

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Kearney/Cooper Power Systems</u>	Series VP - submersible, single-phase and three-phase, vacuum switching, 200 or 600 amp, 15 and 25 kV, with or without VACOP remote operator
<u>Malton</u>	MES 100 Series, pad-mounted single phase and three phase switching
<u>Scott Engineering</u>	Type SPM-REA, 15 kV, 25 kV, 600 amp., three-phase switching, and 200 amp., single-phase switching
<u>S & C</u>	Mark III, Model PMH (with option G-7), 15-25 kV, 600 amp., three-phase switching and 200 amp., single-pole switching Model PME-15-25 kV, Fully enclosed live parts at all times, three-phase switching and 200 amp single pole switching
<u>Trayer</u>	800 Series, pad mounted three-phase vacuum switching equipment, 200 and 600 amp, 15-25 kV with or without fusing 501 submersible vacuum fuse 15-25 kV enclosure, deadfront 200 or 600 amp., 15-25 kV Type SSA (submersible, fused and unfused) 200 and 600 amp., 15-25 kV

Notes:

1. Enclosures on this page must comply with the deadfront requirements of RUS Spec. U-4.
2. The enclosures have been certified as meeting the requirements of ANSI C57.12.28. A copy of the certification is available from the manufacturer.
3. Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to RUS Bulletin 61-3.

U hf - Jacketed Cable Restoration Kits
(For resealing concentric neutral wires after installation of splices in jacketed underground cable.)

(When ordering, specify diameter of cable over jacket.)

Manufacturer	Conditions
<u>Elastimold</u> PCS-1 Power Cable Seal	To obtain experience.
<u>Homac</u> CNC Series Concentric Neutral Cover	To obtain experience.
<u>Raychem</u> WCSM (Tubing Type) MWTM (Tubing Type) CRSM (Wraparound Type)	To obtain experience.
<u>3M</u> HSJ Series (Heat Shrink) SJ Series (Cold Shrink)	To obtain experience.

Conditional List

U hf(2)

July 2002

U hf - Terminator Sealing Kits

(For resealing concentric neutral wires after installation of elbows or outdoor terminations on jacketed underground cable.)

(When ordering, specify diameter of cable over jacket.)

Manufacturer	Conditions
<u>Cooper Power Systems</u> JS200 Elastic Seal	To obtain experience
<u>Elastimold</u> 200 ECS Elbow Cable Shield, Cold Shrink	To obtain experience.
<u>Homac</u> CNC Series Concentric Neutral Cover	To obtain experience.
<u>Raychem</u> ESA, Heat Shrink	To obtain experience.
<u>3M</u> 8450 Series, Cold Shrink	To obtain experience.

U hf - Jacketed Cable Grounding Kits

(For connecting a grounding lead wire to the concentric neutral wires and resealing the jacket.)

(When ordering, specify diameter of cable over jacket.)

Manufacturer	Conditions
<u>3M</u> Model 2252 Cable Grounding Kit	To obtain experience.
<u>CANUSA-EMI</u> Model CFGK-REA Cable Grounding Kit	To obtain experience.
<u>Raychem</u> Model JGK Cable Grounding Kit	To obtain experience.

U hj-1
January 2003

U hj - Bracket, combination arrester, cutout and pothead mounting

Applicable Drawing: UM2, UM2A, UM2-4

Manufacturer	Single Phase	Three-Phase
Aluma-Form	1HCA-18-1PB Series	---

U hp - Terminations, Elbow
(rated for switching on three-phase systems)

(When ordering, specify conductor size, type, whether copper or aluminum and insulation diameter)

Manufacturer	Catalog Number
<u>Cooper Power Systems</u>	15 kV, Loadbreak SBT IV LE215T Series with test point LE215 Series without test point 25 kV, Loadbreak SBT LE225T Series with test point LE225 Series without test point
<u>Elastimold (ESNA)</u>	15 kV loadbreak Style 165LR, without voltage test point Style 166LR, with voltage test point Style 167LR, without voltage test point Style 168LR, with voltage test point 25 kV loadbreak Style 271LR, without voltage test point Style 272LR, with voltage test point Style 273LR, without voltage test point Style 274LR, with voltage test point 35 kV loadbreak Style 375LR, without voltage test point Style 376LR, with voltage test point
<u>Hubbell (Chardon)</u>	15 kV, Loadbreak 9U01A--6--Series 25 kV, Loadbreak 9U01B--5--Series

U hq-1
July 2002

U hq - Terminations, Multipoint

(Items on this page are rated for operation on three-phase systems and may be used on single-phase systems.)

Manufacturer	Catalog Number
<u>Cooper Power Systems</u>	15 kV 2-way, 3-way,& 4-way bushings Series 2637172B with mounting bracket Series 2637164C without mounting bracket 25 kV 2-way, 3-way,& 4-way bushings Series 2637160B with mounting bracket Series 2637166C without mounting bracket
<u>Elastimold (ESNA)</u>	15 kV 2-way bushing, 163J2 3-way bushing, 163J3 4-way bushing, 163J4 25 kV 2-way bushing, 271J2 3-way bushing, 271J3 4-way bushing, 271J4 35 kV 2-way bushing, 373J2 3-way bushing, 373J3 4-way bushing, 373J4
<u>Hubbell (Chardon)</u>	15 kV 2-way bushing 9U07A--2-0 3-way bushing 9U07A--3-0 4-way bushing 9U07A--4-0 25 kV 2-way bushing 9U07B--2-0 3-way bushing 9U07B--3-0 4-way bushing 9U07B--4-0

U hq - Terminations, Feed-Through and Parking Bushings

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Cooper Power Systems</u>	15 kV Insulated Standoff Bushing, 2625063B01M 25 kV Insulated Standoff Bushing, 2625064B01M
<u>Elastimold (ESNA)</u>	35 kV Feed-thru, 373FT Parking Bushing, 371SOP
<u>Hubbell (Chardon)</u>	15 kV Feed-through, 9U07AKF200 Insulated Parking Bushing, 9U07ACF100 Grounded Parking Bushing, 9U07AAF100 25 kV Feed-through, 9U07BCF200 Insulated Parking Bushing, 9U07BCF100 Grounded Parking Bushing, 9U07BAF100

U hq - Terminations, Multipoint

600 Ampere Continuous Current Rating

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Cooper Power Systems</u>	15 kV and 25 kV 2-way, 3-way, and 4-way bushings Series DJ625A_ (with mounting bracket) Series DJ625A_B_ (without mounting bracket) 35 kV 2-way, 3-way, and 4-way bushings Series 2637195C (with mounting bracket) Series 2637184C (without mounting bracket)
<u>Elastimold (ESNA)</u>	15 kV 2-way bushing, 650J2 or 675J2 3-way bushing, 650J3 or 675J3 4-way bushing, 650J4 or 675J4 25 kV 2-way bushing, K650J2 or K675J2 3-way bushing, K650J3 or K675J3 4-way bushing, K650J4 or K675J4

U hr - Secondary tap or splice cover, submersible

Manufacturer	Type or Catalog No.
Blackburn	Type WDBS (#2 through #4/0), Type DBS (250 kcmil through 1000 kcmil)
Connector Mfg. Co.	Utilug Sure Seal
Elastimold (ESNA)	Style 86
ESP	TSC Series
Homac	FSS Series
Kearney/Cooper Power Systems	Aqua-Seal Kit
Preformed	HT Series
Plymouth/Bishop	Splice-Wrap
Raychem	Rayvolve RVS Series
3M	PST Series 8420

Heat Shrink Tubing (with sealant throughout)

Manufacturer	Type or Catalog No.
AMP	Black heat-shrink tubing
CANUSA-EMI	CFW
ESP	HSB
Panduit	Heat shrink insulating cover and tubing
Raychem	WCSM cable sleeves
Sigmaform Corporation	Sigmaform heat-shrinkable products
3M	ITCSN tubular cable sleeve

U hv-1
July 2002

U hv - Cable, Underground
15 kV and 25 kV Cable

Applicable Specification:

Conductor (15 kV):

Conductor (25 kV):

Insulation:

RUS Specification U-1

Copper or Aluminum - #2 AWG through 1000 kcmil

Copper or Aluminum - #1 AWG through 1000 kcmil

Crosslinked Polyethylene (XLP)

(a) indicates Union Carbide 4201 XLP

(b) indicates BP 521 XLP

Tree-retardant Crosslinked Polyethylene (XLP-TR)

(1) indicates Union Carbide 4202 XLP-TR

(2) indicates BP H119Y XLP-TR

(3) indicates BP H118Y XLP-TR

Ethylene Propylene Rubber (EPR)

Neutral:

Copper Concentric Neutral

Jacket:

High Molecular Weight Polyethylene

Manufacturer	Insulation(s)	Flat Strap Neutral Available
Conductores Monterrey, S.A. de C.V.	XLP (a), XLP-TR (1), EPR	No
Condumex	XLP (a), XLP-TR (1), EPR	No
General Cable	XLP (a,b), XLP-TR (1,3), EPR	Yes
Hendrix	XLP (a), XLP-TR (1, 2, 3), EPR	No
Hubbell (Kerite)	EPR	Yes
Nexans Canada	XLP (a), XLP-TR (1), EPR	No
Okonite	XLP (a), XLP-TR (1), EPR	Yes
Pirelli	XLP (a), XLP-TR (1), EPR	Yes
Rome	XLP (a), XLP-TR (1), EPR	Yes
Southwire	XLP (a), XLP-TR (1), EPR	No

U hv - Cable, Underground

600 Volt Cable

Applicable Specification: RUS Specification U-2

Conductor: Copper, #4 AWG and larger; Aluminum, #2 AWG and larger

Insulation: Cross-Linked polyethylene (XLPE)

Manufacturer	Type Conductor
Alcan	Aluminum
Conductorres Monterrey, S.A. de C.V.	Copper or Aluminum
Condumex	Copper or Aluminum
Essex	Copper
General Cable	Copper or Aluminum
Nexans Canada	Aluminum
Okonite	Copper or Aluminum
Pirelli	Copper or Aluminum
Rome Cable	Copper or Aluminum
Southwire	Copper or Aluminum

NOTE: The manufacturers shown above have indicated that their 600 volt cable is suitable for use on 480 volt corner grounded delta circuits.

The above cable may be supplied with UL label for Type USE.

U hv - Cable, Underground

600 Volt Multi-Conductor Cable

Applicable Specification: RUS Specification U-2

Conductor: Copper, #4 AWG and larger; Aluminum, #2 AWG and larger

Insulation: Cross-Linked polyethylene (XLPE)

Cable Configuration: 3 Insulated Conductors Triplexed

<u>Manufacturer</u>	<u>Type Conductor</u>
Alcan	Aluminum
Conductores Monterrey, S.A. de C.V.	Copper or Aluminum
Condumex	Copper or Aluminum
General Cable	Copper or Aluminum
Nexans Canada	Aluminum
Okonite	Copper or Aluminum
Pirelli	Copper or Aluminum
Rome Cable	Copper or Aluminum
Southwire	Copper or Aluminum

The above cable may be supplied with UL label for Type USE.

U hv - Cable, Underground
15 kV and 25 kV Cable

(Alternative Insulation Compound)

Applicable Specification:	RUS Specification U-1
Conductor (15 kV):	Copper or Aluminum - #2 AWG through 1000 kcmil
Conductor (25 kV):	Copper or Aluminum - #1 AWG through 1000 kcmil
Insulation:	Tree-retardant Crosslinked Polyethylene (XLP-TR) (I) indicates Pirelli IE.7100 XLP-TR (II) indicates AT Plastic PowerGuard 320TR (III) indicates Union Carbide HFDB-4202 (IV) indicates Nova Borealis LE 4212
Neutral:	Copper Concentric Neutral
Jacket:	High Molecular Weight Polyethylene
Conditions:	To obtain experience

Manufacturer	Insulation(s)	Flat Strap Neutral Available
General Cable	XLP-TR (II, III, IV)	Yes
Hendrix	XLP-TR (III, IV)	No
Nexans Canada	XLP-TR (II, III)	No
Pirelli	XLP-TR (I, IV)	Yes
Southwire	XLP-TR (III, IV)	No

Conditional List
U hv(2)
July 2002

U hv - Cable, Underground

600 Volt Cable

(Alternative Cable Constructions)

Applicable Specification: RUS Specification U-2 (except as indicated below)

NOTE: Manufacturers listed below are conditionally accepted for alternatives A, B, and/or C for the products listed on pages U hv-3 and U hv-4.

Alternative A: 8000 series aluminum alloy in accordance with ASTM B800 or B801.

Alternative B: Stranding in accordance with ASTM B786 for aluminum 1350 conductors or ASTM B787 for copper conductors.

Alternative C: Abuse resistant (ruggedized) (single or two layer) insulation in accordance with ICEA S-81-570.

Condition: To obtain experience.

<u>Manufacturer</u>	<u>Alternative</u>
Alcan	(C)
BICC	(A) (C)
Pirelli	(A) (C)
Southwire	(A) (B) (C)

U hw - Warning sign

Applicable Specifications: RUS Drawings UM12-1 and UM12-2

Manufacturer	Size (inches)	Danger Sign Catalog No.	Caution Sign Catalog No.
Brady*	7 x 10	46133	46043
	10 x 14	46131	46041
Eastern Metal*	7 x 10	REA 12-1-710	REA 12-2-710
	10 x 14	REA 12-1-1014	REA 12-2-1014
	14 x 20	REA 12-1-1420	REA 12-2-1420
	20 x 28	REA 12-1-2028	REA 12-2-2028
Electromark*	7 x 10	REA-1-7x10-SV	REA-2-7x10-SV
	7 x 10	REA-1-7x10-AC	REA-2-7x10-AC
	10 x 14	REA-1-10x14-SV	REA-2-10x14-SV
	10 x 14	REA-1-10x14-AC	REA-2-10x14-AC
	14 x 20	REA-1-14x20-SV	REA-2-14x20-SV
	14 x 20	REA-1-14x20-AC	REA-2-14x20-AC
	20 x 28	REA-1-20x28-SV	REA-2-20x28-SV
	20 x 28	REA-1-20x28-AC	REA-2-20x28-AC
Lem	7 x 10	LSS-1400	LSS-1500
	10 x 14	LSS-1401	LSS-1501
	14 x 20	LSS-1402	LSS-1502
Lyle*	7 x 10	UM12-1-710	UM12-2-710
	10 x 14	UM12-1-1014	UM12-2-1014
	14 x 20	UM12-1-1420	UM12-2-1420
	20 x 28	UM12-1-2028	UM12-2-2028
May Advertising	7 x 10	MY710C	MY710B
	10 x 14	MY1014C	MY1014B
	14 x 20	MY1420C	MY1420B
	20 x 28	MY2028C	MY2028B
For pressure sensitive decal add "D" prefix			
Truck Sign Service*	7 x 10	TSD-710	TSC-710
	10 x 14	TSD-1014	TSC-1014
	14 x 20	TSD-1420	TSC-1420
	20 x 28	TSD-2028	TSC-2028

*Reflective signs also available.

The signs listed on this page are to be secured to equipment and transformer enclosures by means of an adhesive or by welding. Screws and rivets are not to be used.

U hx - Cable Route Marker

<u>Manufacturer</u>		<u>Catalog Number</u>
	<u>Surface Mounted</u>	
Hubbell (Chance)		C554-0001
	<u>Above Grade</u>	
W. H. Brady		BL1 (Decal on one side) BL2 (Decal on both sides)
Carsonite		REA-100
Electromark		REA-3-4x7-SV REA-3-4x7-AC REA-3-5x12-SV REA-3-5x12-AC
Flexstake		603, 604, 605, 606
Greenline		FLU-78 (Decal on one side) DSU-78 (Decal on both sides)
Hubbell (Chance)		C554-0183
Lyle		UM12-712
May Advertising (For pressure sensitive decal add "D" prefix to catalog number.)		MY45A, MY712A
Quantum		QM-375
J Miller Industries		JMI-375
Truck Sign Service		BCW-712

U hy - Splice, Underground, Permanent

(when ordering, specify conductor size, type, whether copper or aluminum and insulation diameter)

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Cooper Power Systems</u>	<u>15 kV and 25 kV</u> EZ II straight and transition splice #3 through 4/0 <u>35 kV</u> 2603934B Series straight splice
<u>Elastimold (ESNA)</u>	<u>15 kv</u> Style 1500S, straight splice, through #1/0 Style 25-S, straight splice, 2/0 through 4/0 Style I5PCJ-1, straight splice, through 4/0 Style 25-Y, Y-splice <u>25 kV</u> Style K-25-S, straight splice Style K-25-Y, Y-splice Style 25PCJ-1, straight splice, through 4/0 <u>35 kV</u> Style M-250-S, straight splice
<u>Hubbell (Chardon)</u>	<u>15 kV</u> Straight Splice through #1/0, Model 9U16A-100 "Uni-Matic" Through #2/0, Model 9U06A <u>25 kV</u> "Uni-Matic" Through #2/0, Model 9U06A
<u>Pirelli</u>	<u>15 kV and 25 kV</u> "Elaspeed" style EPJMe straight splice, #2 through 1000 kcmil
<u>3M</u>	<u>(15, 25, 35 kV)</u> 5400 Series Quick Splice/Quick Splice II/Quick Splice III, 15 kV 5411R cable repair splice 5411R/HSJ-I cable repair splice (for jacketed cable)

U hy-1.2
July 2002

U hy - Splice, Underground, Permanent

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

Manufacturer	Catalog Number
<u>Raychem</u>	<u>15 kV</u> HVS 1510-R__ 200 Amp Splice kit
	<u>25 kV</u> For Bare Concentric Neutral Cable: HVS-2510-REAX in-line joint HVS-2510E-R-REAX repair joint For Jacketed Cable: HVS-2510-JCN-REAX in-line joint HVS-2510E-RJ-REAX repair joint
	<u>35 kV</u> For Bare Concentric Neutral Cable: HVS-3510E-REAX in-line joint For Jacketed Cable: HVS-3510E-JCN-REAX in-line joint
<u>Sigmaform</u>	<u>15 kV</u> SSK Series (Heat Shrink)

U hy - Splice, Underground, Separable

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

Manufacturer	Catalog Number
<u>Elastimold (ESNA)</u>	15 kV Style 151-SR, receptacle Style 151-SP, plug Style 150-DP, deadend plug Style 150-DR, deadend receptacle Style 150-T, T-tap
	25 kV Style K-151-SR, receptacle Style K-151-SP, plug Style K-150-DR, deadend receptacle Style K-150-T, T-tap

U hy-3
July 2002

U hy - Splice, Underground, Permanent

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

600 Ampere Continuous Current Rating

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Cooper Power Systems</u>	15 kV 2604904B Series straight splice (MPS-600)
	25 kV 2604905B Series straight splice (MPS-600)
<u>Elastimold (ESNA)</u>	15 kV Style 650-S, straight splice Style 15PCJ-2, straight splice, through 1250 kcmil Style 650-Y, Y-Splice
	25 kV Style K650-S, straight splice Style K650-Y, Y-splice Style 25 PCJ-2, straight splice, through 1250 kcmil
	35 kV Style M650S, straight splice

U ja - Equipment Flat Pad*

Manufacturer	Catalog Number
<u>Armorcast</u>	600 Series, Polymer Concrete P600XXXX Rotocast, LLDPE
<u>Associated Plastics</u>	API 4000 Series RPM
<u>Carolina Dielectrics</u>	Model 0502-1, Fiberglass, Size:40"x44"
<u>CDR Systems (Homac)</u>	PP Series, Fiber reinforced polymer concrete
<u>Diversitech</u>	TP Series - Fiberglass reinforced concrete
<u>Electri-Glass</u>	Fiberglass LP-4145, 41" x 45"
<u>Electrical Materials</u>	Molded HMW Polyethylene Model 64-3BC, 42" x 41" x 4" Model 65-4BC, 52" x46"
<u>Electrimold</u>	EPPT
<u>Fiberglas Fabricators</u>	FFBPPC Series, Polymer concrete hybrid
<u>Formex</u>	Mode1 TP-REA, Molded polyethylene
<u>Heil Rotomold, Inc.</u>	T Series, High density polyethylene
<u>Highline</u>	HL-46B, Fiberglass, Size: approx.42"x42"
<u>Hubbell (Chance)</u>	C107-0162 Fiberglass, Size: 40" x 44"
<u>Major Frame-Crete</u>	ETPP precast, cellular concrete, 42"x42"
<u>Nordic</u>	TP Series, Fiberglass
<u>PenCell Plastics</u>	TP-4220, TP-4224, TP-4227
<u>Quality Rubber Company</u>	34242 light-weight concrete
<u>Quazite Corp.</u>	Composolite - PH Series
<u>RMI-D</u>	Dwg. No. 730126-2, Molded polyethylene Size: 42" x 42"
<u>Smith Cattleguard</u>	Easi Set T. Series, Precast Reinforced Concrete
<u>Thermodynamics</u>	Poly-Pad, PR Series, Molded polyethylene

*Order by catalog number and size.

U ja-2
July 2002

U ja - Equipment Box Pad (Sleeve)*	
Manufacturer	Catalog Number
<u>Acura Fiberglass Corp.</u>	Model AG 4532
<u>Associated Plastics</u>	Transformer pad and box assembly, API 4242 RPM Pad and 1730 Box Transformer Pads, API 16 and API 45
<u>Blue Grass Vault Company</u>	BG-PV-T, BG-PV-1, BG-PV-2
<u>Concast</u>	Fibercrete modular bases
<u>Custom Composites</u>	R Series Fiberglass
<u>D & L</u>	Fiberglass
<u>Electri-Glass, Inc.</u>	BP-2000
<u>Electrimold</u>	EFBT,EFBS,EFBG Series
<u>Fiberglas Fabricators</u>	Transformer pad and sleeve assembly, FFBP series
<u>Formex</u>	Transformer pad and box assembly - TP-REA Series Pad, 1730-A Series Box
<u>Highline</u>	Box pad HL-45A, Size: L-43", W-34-1/2", D-32" Model AG 4532
<u>Malton</u>	FGS Series Fiberglass ground sleeves and box pads
<u>Maysteel</u>	CW-GS-P Series
<u>Mor-Tech Fab</u>	Transformer pad ground sleeves
<u>Nordic</u>	GS Series Fiberglass (excluding GS-37-43-15-A) CBP-37-43-15-A
<u>PenCell</u>	Transformer pad and box assembly- TPS-20-PE Pad, PE-20GS Box
<u>ProGlass, Inc.</u>	TX, SR, S, and SG Series (All without optional lids)
<u>Quality Fiberglass</u>	QF Series
<u>Thermodynamics</u>	Poly Pad - VC series (VCC-P series covers available) Polyethylene

*Order by catalog number and size.

U jb-1
July 2002

U jb - Splice Shield
(Refer to Drawing UK5)

Manufacturer	Catalog Number
<u>Kellems</u>	No. 014-03-1429

Conditional List
U sc(1)
July 2002

U sc - Regulators, voltage, pad-mounted
for underground distribution

12.5/7.2 kV

Manufacturer	Conditions
<u>Siemens-Allis</u> Single-phase, step-type pad-mounted regulator Type PFR (76.2, 114.3 & 167 kVA)	To obtain experience.

U sd - Current Transformers
600 Volt

Direct Burial Type

<u>Manufacturer</u>	<u>Type or Catalog No.</u>
General Electric	JAL-O

Indoor Type for Pad-Mounted Transformers

<u>Manufacturer</u>	<u>Type or Catalog No.</u>
ABB	CMV
G.E.C. Durham Industries (Astra)	AP
General Electric	JAB-O
Schlumberger	R6P

U si-1
July 2002

U si - Anodes, Sacrificial
(Drawings UM11-1, UM26, UM27, M2-7, M2-17)

Zinc Anodes*

	<u>Pre-packaged With Connecting Wire</u>			<u>Bare Continuous Strip (Ribbon)</u>	
	<u>12 lbs.</u>	<u>30 lbs.</u>	<u>60 lbs.</u>	<u>5/8" x 7/8"</u>	<u>1/2" x 9/16"</u>
Cathodic Protection Services	12HII-4A	30HII-4A	60HII-4A		
Federated Metals	S-12 packaged	S-30 packaged	S-60 packaged	Regular Size Type II	Junior size
Harco	AZC12GJ	AZC30GJ	AZC60HJ		
Mesa	S-12 packaged	S-30 packaged	S-60 packaged	Regular Size	Junior size
Stuart	SZ-12	SZ-30 -----VIBROX packaged-----	SZ-60		

*When ordering, specify zinc anodes that meet ASTM B418-73 Type II Composition and RUS Specification DT-9, "RUS Specification for Zinc Sacrificial Anodes."

U si - Anodes, Sacrificial
(Drawings UM11-1, UM26, UM27, M2-7, M2-17)

Magnesium Anodes**

	Standard Potential				High Potential			
	17 lbs	20 lbs	32 lbs	50 lbs	17 lbs	20 lbs	32 lbs	48 lbs
Cathodic Protection Services	AMH17A packaged	-	AMH32A packaged	AMH50A packaged	17D3 packaged	20D2 packaged	32D5 packaged	48D5 packaged
Federated Metals	17 packaged	-	32 packaged	50 packaged	-	-	-	-
Global Cathodic Protection	-	-	-	-	17D2	20D2	32D3	48D5
Harco	AMC17J	AMC20J	AMC32J	AMC50J	AMC17G	AMC20G	AMC32G	AMC48G
Kaiser Mag.	17 Vibra Pak	-	32 Vibra Pak	50 Vibra Pak	17 Electromag Vibra Pak	-	32 Electromag Vibra Pak	50 Electromag Vibra Pak
Mesa	17 packaged	-	32 packaged	50 packaged	17D Series	20D2	32D Series	48D5
Stuart	SM-17	-	SM-32	SM-50	SM-17H	-	SM-32H	SM-48H

**When ordering, specify magnesium anodes that meet RUS Specification DT-10, "RUS Specification for Magnesium Sacrificial Anodes."